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Trumpet No End: How has high register trumpet playing evolved in jazz?

Introduction

Upper register playing is an ability that has made its way into normal trumpet technique through its prominent use in jazz. It is a difficult skill to master, requiring the utmost technical proficiency and physical manipulation, and it is seen by many as the pinnacle of trumpet technique. In this thesis I will analyse different aspects of high register trumpet playing beginning with an examination of the physiology involved and why it is so crucial to sustained playing in this register. I will then look back to the Baroque, classical and romantic periods to see how high trumpet playing was practised during these periods to determine if a comparison exists in relation to its use in modern times, and why the use of the technique appeared to die out at the beginning of the 19th century. Finally, I will trace the technique's resurgence in popularity in jazz and examine how a new breed of players would overcome the physical difficulties needed, bringing a new level of virtuosity and showmanship to the instrument.

Ultimately, I intend for two major points to be drawn from this thesis; firstly, an understanding of the progression that exists in trumpet technique and how special techniques like high register playing have become standardised. Secondly, how trumpet technique and more specifically how high register playing is directly linked to physiology, the importance of which is paramount for both the student and teacher alike.

Physiology

Playing any instrument to a high level requires an understanding of how physically one plays. Whether it is the oscillation of a string caused by the finger plucking a string, or using the mouth in such a way as to cause vibrations. Instrumentalists are aware of the effects of making such physical actions. Many neglect to understand what is actually happening within the body further than this simple understanding. Appreciating on a physical level what one is doing in relation to an instrument can help a player vastly improve technique. One can learn to control and manipulate the muscles involved and gain a "feel" of when one is doing something correctly, and when something is wrong. A mental picture can also be created; if one can picture it in the mind's eye, it is much easier to manipulate the muscles required[1].

The physiology involved with playing a brass instrument is of particular interest as physiology and technique are directly linked. On the most basic level, a note is produced on a brass instrument by air flow from the lungs, through the mouth and through a small gap in the lips to the instrument. To get this process working correctly requires much practice and to master it requires a lifetime.

How does basic technique need to be adapted for extreme register playing?

I will discuss the aspects of brass playing that are rudimentary and will also cover how *breathing*, *embouchure*, *aperture*, *throat* and *tongue* are affected by playing in the upper register of the instrument. We shall begin with breathing as is it here where air is manipulated first.

Breathing:

When we breathe in, two lots of muscles are involved; the diaphragm and the intercostal muscles. The diaphragm separates the thoracic cavity from the abdominal cavity and has an inverted dome-like shape located just below the lungs. When we breathe in, this muscle contracts and the dome-like shape flattens. At the same time the intercostal muscles running between each rib contract lifting the rib cage upwards. Both muscle groups cause the volume of the thoracic cavity to expand creating a vacuum so that air rushes into the lungs. To breathe out, these muscles both relax causing an upward compression of the lungs from the diaphragm and a lowering of the rib cage by the intercostal muscles. Both muscles decrease the volume of the thoracic cavity and the increased pressure causes air to rush out of the lungs.

Farkas comments that “air cannot be permitted to leisurely *drift into* the horn as in normal exhalation, but must be steadily projected through the instrument” [2]. Normal exhalation is a relaxing process, the diaphragm moves upwards compressing the lungs and forcing air outward in an uncontrolled and unpredictable manner. Farkas maintains that it is “nature’s perfect design” that gives a wind player the control over his/her exhalation process. Instead of simply allowing the diaphragm to relax to its original position, the waist muscles, pulling in opposition to the diaphragm, must be actively

[1] J. Ridgeon: "How Brass Players Do It" (Rutland, 1990), p.6
[2] P. Farkas: "The Art of Brass Playing" (Atlanta, 1989), p.60

contracted as the diaphragm relaxes. As the two muscles oppose each other, control can be gained over the rate that the diaphragm moves upwards toward its original position[3].

Control is key to breathing properly when playing a brass instrument. A brass player must learn how to manipulate both the diaphragm and intercostal muscles independently as both are required in varying degrees to push air through the instrument. Breathing in using only the intercostal muscles, indicated by a raising of the chest and shoulders will not give the player enough air to play for an extended period, neither will it provide the required support. The diaphragm is the more important muscle of the two as this muscle allows more air to enter the lungs and provides support and control over the exhalation process. When playing a brass instrument it is vitally important to assess how much air will actually be necessary to play a certain passage. Too little air and the player will feel choked, unable to support an extended phrase. Too much air however "causes an explosive sensation in the chest, throat and head cavities, resulting in the inability to achieve satisfactory control of anything other than a loud passage"[4]. A happy medium must be adopted so that the player has sufficient air for life support as well as playing an extended musical line. Breathing should not be affected by playing in the extreme upper register and should be done in the same way as normal playing.

The Glottis:

The glottis is the middle part of the larynx, where the vocal cords are located. During speech the vocal cords open and close chopping up the steady flow of air into little puffs of sound waves. In brass playing the glottis is primarily a volume controller, widening and narrowing to allow a varying sized air stream through. For a loud note, the glottis will remain widely open allowing a large column of air through. For a soft note however, the glottis narrows as a finer stream of air is required to play quietly. Ridgeon comments that it is resistance from the glottis that gives brass players the required breath control to play the instrument effectively. He gives the example that if one is to take a large breath and produce a "HAA" sound breathily without exercising the vocal cords, the exhalation is very quick. If the same thing is repeated but vocally this time, the exhalation takes much longer.[5] The glottis, as a resistor allows a player to control the "sudden gush of breath from the lungs following the contraction of the abdominal muscles".[6] A soft note therefore can be sustained for much longer as the glottis is nearly fully closed. Ridgeon also observes that *too much* resistance in relation to abdominal support will create a "bottle neck" effect which does not sound good aurally and can be harmful to the player.[7] In terms of high playing the glottis still remains a volume controller and should be used as normal.

Embouchure:

The embouchure refers to a number of muscle groups situated around the mouth. There are different schools of thought on the best way to form the embouchure and manipulate these muscles. Firstly however, we must get an understanding of what muscle groups are involved and how they function.
The facial musculature can be classified into three groups, based on where they insert on the face. Group one inserts into the modiolus, group two inserts into the upper lip and group three inserts into

[3] ibid., p.60
[4] Ridgeon, op.cit., p.3
[5] Ibid
[6] Ibid
[7] Ibid

the lower lip.[8] *Refer to the Grey's anatomy facial muscle diagram in the appendix for more detail on these muscles.*

Before examining the formation of the embouchure it is vital that we understand the comparative strengths and weaknesses of each muscle group. Groups two and three, those muscles that pull flesh away from the mouth are relatively strong. To observe their relative strength visually; place a finger on either side of the mouth and grin broadly. This motion contracts the *zygomatic major* muscle and raises the corners of the mouth, pulling flesh away from the centre of the lips.[9] The orbicularis oris is the key muscle involved in forming the embouchure and acts against this motion. This muscle is relatively weak compared with those muscles attempting to pull the mouth apart. To aid in the struggle between the opposing direction of muscle movement, the remaining muscles of group one aid the orbicularis oris. This modiolus muscle group acts as a sort of mediator between the outward and inward contractions of the muscles and influences the texture of the lips. We have established that forming the embouchure requires the manipulation of the muscles around the mouth into a state so that they are under tension. The culmination of this tension is the formation of a small hole in the centre of the lips called the aperture.

The Aperture:

The orbicularis oris muscle is very versatile; one of the four movements it can make is the pressing together of the lips. The muscles around the mouth pulling in the opposite direction mean that the orbicularis oris cannot quite achieve this forming a small gap between the lips. The shape of the aperture itself can be compared to the shape of an oboe reed[10]. Like an oboe reed, if its shape is not exactly correct, problems set in.

Exercise of the muscles around the mouth through playing gives a performer strength, endurance, flexibility, and control of this musculature. This allows him/her to control the size and shape of the aperture very precisely. Aperture size helps to determine the pitch of the note. The smaller the aperture, the higher the pitch as the thinner air column causes higher frequency oscillations in the lips as one forces air through the aperture faster. The larger the aperture, the lower the pitch as the frequency of the oscillations is reduced as the air forced through the lips is moving slowler. Ideally, one must keep the embouchure fixed in place. The only movement that should be made is the slight change in tension required to adjust the size of the aperture. The shape of the aperture must remain the same in every octave. The following graph shows how the qualities of the airflow are controlled:[11]

[8] Lips and Perioral Region Anatomy
[9] Ridgeon, op.cit., p.6
[10] Farkas, op.cit., p.38
[11] J. Miller: "The Good Brass Guide: Trumpet Book 2" (London 1999), p.22

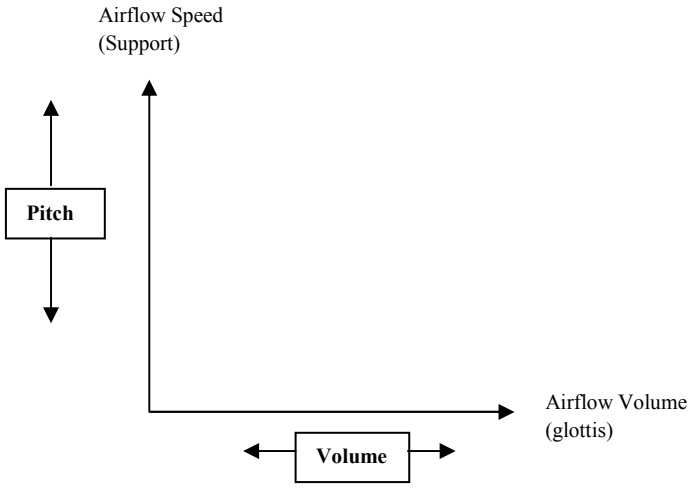

Figure 1.1: Miller airflow speed against volume graph

According to Farkas the aperture can be compared to the string of a violin. If a stretched string is halved in length precisely and plucked, it will sound at exactly an octave above the original tone. The same principle is true of the brass player's-aperture; an octave rise can be achieved by halving the size of the aperture, whilst an octave descent can be achieved by increasing the aperture size double.[12] A player is not aware of such minute changes in size however, he/she simply plays what is written; this adjustment in size is learnt and embedded in the subconscious through hours of practice.
The embouchure is essentially a tug-of-war between those muscles which act to pull the lips apart and those which bring them together. When moving into the higher register of the instrument, this tug-of-war is intensified. Each muscle must act under more tension to hold its position ultimately firming the texture of the lips and reducing the aperture size. This will allow a player to keep the oboe-reed shape of the aperture, and keep the lip texture firm but not stretched. To return to the tug-of-war analogy, each team will increase its strength when playing higher and higher, but in exact proportion to one another. This means that no matter what octave one plays in, the embouchure should remain constant.[13] The opposite effect is true when playing fundamentals on the trumpet. Pedal notes are never seen in written music but are an extremely useful tool for brass players. To successfully play in the extreme low register of the instrument, the aperture must be at its largest. This allows lots of air through the instrument and causes the lips to oscillate slowly. To form a large aperture; all the muscles must be relaxed causing the orbicularis oris to pucker the lips more than normal. Pedal notes are used by brass players to help relax the embouchure.

The Tongue:

The tongue is used to articulate a note . When a note is tongued on a brass instrument, the tongue itself determines how much attack is placed on the front of the note. The letter used is “t”. The tongue should touch the back of the top front teeth as this letter is said and as it moves back, air should flow out of the mouth. The image of a spitting cobra gives a useful analogy of how the tongue should move back and forth during a rapidly tongued phrase. How much attack is placed on the front of the note is determined by how forcefully the “t” is said with the tongue. Spitting the letter will result in a short, spiky note whilst softly saying the letter will give a rounder, more beautiful sound. A lot of players who specialise in extreme high playing will generally shy away from tonguing each note as this would require him/her to constantly stop and start the fast moving air stream. Instead, these kinds of players

[12] Farkas, op.cit., p.40
[13] Ibid, p.15

tend to slur phrases or passages so that they can keep the air stream constant, all that needs to be done is to press the fingers down and exhale in a long and controlled manner.

Mouthpiece Pressure

Mouthpiece pressure refers to how hard one is pushing the instrument onto the face. Brass players use mouthpiece pressure to create a seal between mouthpiece and lips. A small amount of mouthpiece pressure is always present; if none were used the instrument could not be secured in the correct position. A slight increase in pressure will be used when ascending on the instrument. Likewise, a reduction of pressure will be used as a player descends on the instrument. Problems occur however when excessive mouthpiece pressure is used and relied upon.[15]
At any level of skill, a brass player will always admit to using too much pressure as he/she tires toward the end of a concert, rehearsal or when going for high notes. Mouthpiece pressure should be used as little as possible as it is the musculature tension at the corners of the mouth that hold the embouchure in place. Ideally, these muscles should tire first before any tiredness enters the lips themselves. It is when the corners of the mouth lose their tension through fatigue that mouthpiece pressure is generally resorted to. The reason for this temptation is twofold:

Firmness:

1. As the lip muscles tire, it becomes harder to keep the embouchure fixed in its correct position. Therefore it is more likely that the seal between lips and mouthpiece will be compromised as it will be harder to keep air flowing directly into the mouthpiece. "Fatigued muscles lose their ability to contract firmly" and it is this inability that causes the seal to be compromised.[16] In this case a strong embouchure cannot be maintained by muscles alone, mouthpiece pressure is used to artificially maintain the seal causing the lips to firm.[17]

Aperture size:

2. To play in the high register, the muscles of the embouchure must be under high tension, causing a firming of the lip texture and a reduction in size of the aperture. Increased mouthpiece pressure can be used to help compress the lips together and reduce the size of the aperture when tired.

"Imagine a nice, fresh, spongy doughnut, sandwiched between two pieces of plate-glass. If these pieces of glass are slowly pressed together, the hole in the doughnut can be observed to gradually get smaller as the doughnut itself is flattened. But at the same time, this pressure also compresses the "flesh" of the doughnut into something much firmer than its original spongy consistency.... Unfortunately, the poor lips suffer the same abuse as did the crushed doughnut, and, of course, human lips cannot take this punishment indefinitely." [18]
To sustain a firm embouchure, a tired player can be forgiven for resorting to more mouthpiece pressure. This can be a conscious effort for the more experienced player as he/she approaches the end of a concert. For the beginner, it will appear to be the only way of obtaining higher notes as the embouchure has not developed yet. Excessive pressure should be avoided at all costs.

[15] K. Steenstrup: "Teaching Brass, 2nd Revised Edition" (Aarhus, 2007), p.37
[16] Farkas, op.cit., p54
[17] Steenstrup, op cit., p. 115
[18] Ibid, p.53

Muscle Exposure

Muscle Structure:

There are three types of muscle in the body; unstriped, cardiac and skeletal. Unstriped and cardiac muscles are involuntary and we have no control over them. Skeletal muscle is voluntary and gives us control over the movement of our bodies, it is this type of muscle that forms the embouchure.
Skeletal muscle is made up of overlapping fibres. Within these fibres are even thinner fibre-like structures called myofibrils. Myofibrils contain two types of protein filaments (thread-like structure), a thicker one made of the protein myosin and a thinner one made of the protein actin. Notice how the two protein filaments are arranged. Each thicker myosin filament surrounded on both sides by the thinner actin filament. One of these structures is called a sarcomere and there are many thousands in each muscle.

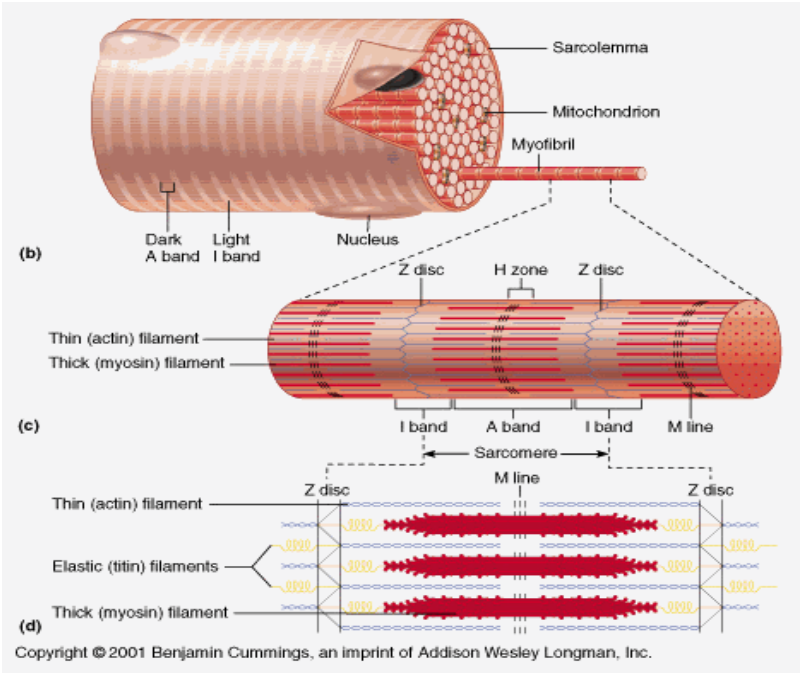

Figure 1.2: Myofibril diagram

Muscle contraction begins with an impulse from the brain that instructs the muscle fibre to release calcium. The calcium allows the two protein filaments, myosin and actin to form cross-bridges at specific points along the actin filament called binding sites. When contraction occurs, the thicker myosin filament remains stationary and the cross-bridges tilt and pull the actin causing each sarcomere to shorten, therefore shortening the entire muscle.

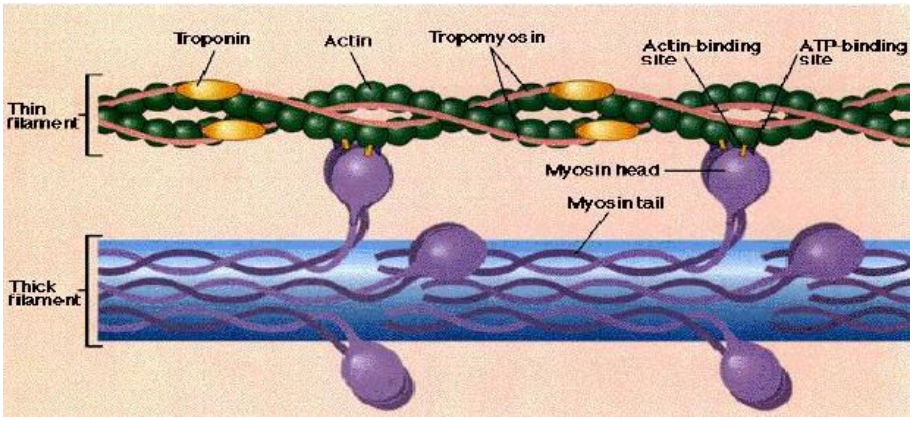

Figure 1.3: Muscle contraction diagram

As each cross-bridge finishes its pulling movement, it detaches and returns to its start position moving through a "recovery stroke" before binding to another site on the actin and starting over again. The arrangement of the cross-bridges form a spiral so that as some return to their start position others perform the pulling action which keeps movement smooth. This process is known as a ratchet system because the actin filament is moved one step at a time by the myosin.
Although calcium is the substance which triggers contraction, it is also responsible for ending the process. The substance which sustains contraction by giving the cross-bridges the energy required to bind to the actin is a substance called ATP (Adenosine Triphosphate). ATP contains large amounts of stored energy and is generally considered to be the "molecular unit of currency". During anaerobic respiration it is produced by splitting stored glucose molecules to create a source of energy. When the glucose stores are depleted, cells require oxygen to create ATP within mitochondria (the cellular power-plant). This is why breathing rate increases as the body requires more oxygen.

The brain controls how strongly a muscle contracts by controlling how many fibres contract, and by how much. The brain sends an action potential (electrical signal) to a neuromuscular junction and the fibre will twitch once. The muscle will then take a short amount of time to relax as it returns to its starting position. If a second action potential is received by the neuromuscular junction before the fibre has fully relaxed, it will add to the effect of the first - this is known as "summation". As with most contractions, rapid sequences of action potentials are received in a strong, continuous contraction called "tetanus". Approximately 150 muscle fibres are controlled by a single motor neurone; together they are called a motor unit. If the brain requires a greater contraction, it recruits more motor units by sending out more action potentials.

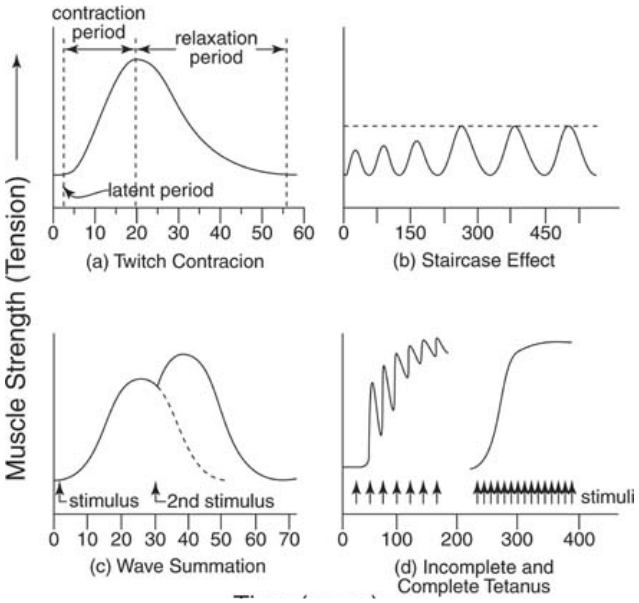

Figure 1.4: Action Potential diagram

Fast , Slow and Intermediate Fibres

Skeletal muscle fibres can be further categorized into how quickly they twitch and tire. There are three types of fibres;

1. **Fast fibres** are able to contract very quickly after stimulation. They possess large reserves of glycogen offering an abundance of readily available energy but are unable to quickly create new energy reserves due a lack of mitochondria. They contain densely packed myofibrils meaning that this type of fibre is very strong. The downside is that this type of fibre will tire very quickly as they use large amounts of energy and are dependent on anaerobic respiration, as with activities like sprinting or jumping.

2. **Slow fibres** contract slowly after stimulation, but can continue to contract for extended periods of time. They contain less glycogen reserves but are able to generate energy. Slow twitch fibres fatigue very slowly because ATP can be produced during contraction. Slow twitch fibre is constantly producing energy to fuel the muscle and are used for activities such as walking and jogging.

3. **Intermediate fibres** contain properties of both fast and slow twitch fibres. In appearance, they look similar to fast twitch muscle but are much more resistant to fatigue.

Lactic Acid

During activity, the anaerobic process of "glycolysis" is relied upon to generate additional ATP when mitochondria cannot keep up with demands. The process is relatively inefficient however and

produces the by-product lactic acid. Lactic acid can change the pH level of the cell causing enzymes within the cell to stop working.

Fatigue

"A skeletal muscle fibre is said to be fatigued when it can no longer contract despite neural stimulation"[19]. During short, peak activity ATP stores will deplete quickly, and the reliance on anaerobic respiration for this type of activity means that there will be a build-up of lactic acid.
After long exertion, physical damage can occur to the part of the cell that regulates calcium concentration in the muscle, known as the "sarcoplasmic reticulum". As previously stated, calcium is the biological switch for contraction so any damage will result in the muscle not functioning properly.[20]
If we now examine muscle fatigue in terms of the embouchure we can infer that the muscles of the face are made up of fast twitch fibres. Facial expressions and speaking require swift, strong but short contractions and are therefore never normally used for long periods of time and are prone to fatigue. To any brass player, this hinders the ability to last the duration of a concert or a rehearsal. Most muscles contain a mixture of the three muscle fibre types, though the ratio of fast to slow is genetically determined so you will be born either a distance runner or a sprinter. It is possible however, through exercise to change the proportion of some muscle fibres; "...if a muscle is used repeatedly for endurance events, some of the fast fibres will develop the appearance and functional capabilities of intermediate fibres. The muscle as a whole will thus become more resistant to fatigue" [21] . If we think of the embouchure as a group of fast twitch muscles with little endurance capabilities, the physical exertion of playing a brass instrument will exercise the embouchure. In time, the muscle fibres will become accustomed to this pattern of neural stimulation and eventually develop characteristics of intermediate fibres. The muscle will then be able to last longer.

Martini points out that for muscles to function properly they require:

1. Substantial energy reserves
2. A normal circulatory supply
3. A normal blood oxygen concentration[22]

Normal circulatory supply and blood oxygen concentration are vital to continued muscle contraction as both deliver oxygen and nutrients to where it is needed most. Pressure applied to the face by the mouthpiece however will act to cut off this circulation during playing; the harder one pushes, the less blood that can circulate. This lack of oxygen accelerates the build-up of lactic acid and therefore will induce muscle fatigue. Also, if a player does not breathe correctly or enough when playing, a normal blood oxygen concentration will be reduced. (I have ignored the substantial energy reserves requirement as this will not apply provided a player has eaten at some point before playing).

[19] F. Martini: "Fundamentals of Anatomy and Physiology" (Pearson Education , 2005), Chapter 10
[20] Ibid
[21] Ibid
[22] Ibid

Muscle Exposure Conclusion

The term "tetanus" refers to a strong prolonged contraction where rapid sequences of action potentials are received at a neuromuscular junction. This form of muscle contraction is what occurs when forming the embouchure. The effort required to sustain the embouchure is directly correlated to range. A player's highest note will be the strongest contraction that their embouchure is able to perform at that time. This note cannot be sustained for long as the muscles will tire quickly because this level of contraction is not often used. Being able to sustain the embouchure in a state of maximum tetanus for long periods is what most brass players are striving towards. Endurance is simply a players ability to hold the embouchure fully contracted for a long time. It is therefore important to practice these aspects of technique through consistent practice. Repetitive, exhaustive stimulation causes muscles to enlarge as each fibre increases in diameter and strength; this is known as "hypertrophy". Champion weightlifters are perfect examples of this process, developing stronger contracting muscles to allow them to lift bigger weights.[23] In brass playing, the principle is essentially the same; the embouchure must be exercised repeatedly to its maximum effort to gain strength and a familiarity in the extremes to increase range and strength.

After a prolonged period of playing, although the brain is still sending signals to the embouchure, the muscles themselves cannot contract any more. A brass player at this point might say "my chops are gone", referring to the fact that the embouchure cannot sustain itself so the player struggles to play high notes. The only solution at this point is rest as any further playing will not serve any purpose in terms of building the muscles.

Warming up and warming down are very important to brass players. Warming up does not just serve the purpose of getting the fingers moving or the brain to think musically. The process helps to re-activate facial muscles that have not been used since the instrument was last played. Most athletes will do some sort of gentle exercise at first to get the muscles moving and the blood flowing. The embouchure must be warmed up in this fashion; gently at first by playing in the low to mid-range, then slowly working upwards to maximum contraction of the embouchure.

After a long period of playing high, the embouchure has been at its maximum contraction or very close to it for a while, meaning that the muscles involved will be tight and a higher concentration of lactic acid will be present. To leave the muscles in this condition would be a bad idea as when the instrument is played next the muscles may not have fully recovered. The process of warming down is done by playing sustained pedal notes to help reset the embouchure to its original resting state. This relaxes the muscles and has the same effect as massaging a tight or strained muscle group.

[23] Ibid

Injury

The lips are delicate structures and the tissue is very sensitive. Injury to the lips will mean that a player should rest; any playing on an injury would exacerbate the affected area and cause the player to be out of action for even longer, it could also lead to permanent damage.
The first documented case of a "split lip" to appear in a medical journal was in 1982. Dr. Planas M.D named the condition "Satchmo Syndrome" after Louis Armstrong, who had a similar injury in 1935.[24] Dr. Planas found that his patient was no longer able to pout the lips correctly to form the embouchure. When attempted, "his lips trembled and looked weak and especially flat in the middle part of the lower lip" [25]. After surgery, Dr. Planas found this weakness was caused by a rupture in the orbicularis oris, "its end joined by a fibrous bloodless band" (scar tissue).[26] He also found that most of the muscle fibres were intact but stretched. Dr. Planas made the diagnosis of an "anatomic defect in the continuity of the orbicularis oris".[27]
Dr. Planas' article gives us a valuable insight into the inner workings of the embouchure. Clearly the rupture of the orbicularis oris was causing his patient difficulties, meaning that he was unable to hold the lips in the proper position to play. Dr. Kaye also observes that the bloodless fibre found "interposed between the separated ends of the orbicularis muscle.... produced a lengthening of the circumference of the orbicularis oris". [28] This is similar to stretching a rubber band beyond its elastic limit, the lengthening of the rubber band means that it will become deformed and not be able to stretch as far as it once did. Lengthened muscles cannot exert as much pull as muscles of normal length.

There are several ways that one might injure themselves whilst playing a brass instrument:

1. Accommodating new circumstances[29]
2. Excessive mouthpiece pressure[30]
3. Flawed technique[31]
4. Failure to warm-up[32]
5. Wet vs. dry lips[33]

Accommodating new circumstances is how Dr. Kaye describes changing one's playing technique, whether it to be through playing on a new mouthpiece or altering the embouchure. Making such a change produces "new stresses and strains" on the lip musculature.[34] Any sudden change will mean that underdeveloped musculature may take a more primary role in the embouchure. Injury can follow if the player continues to play normally (all over the range) on this underdeveloped muscle rather than

[24] J. Planas: "Rupter of the Orbicularis Oris in Trumpet players (Satchmo Syndrome)" *Plastic and Reconstructive Surgery* (April 1982), pp. 690-691
[25] Ibid
[26] Ibid
[27] B. Kaye: "Discussion of Rupture of the Orbicularis Oris in Trumpet Players (Satchmo Syndrome)" *Plastic and Reconstructive Surgery* (April 1982), pp. 692-693
[28] Ibid
[29] Ibid
[30] Bill Milkowski: "Lip Injuries and Trumpet Playing: An Unhappy Marriage" *Jazz Times* (21.11.09)
[31] Ibid
[32] F. Shuster: "When Your Chops are Shot" *Downbeat Magazine* (October 1995) p.22
[33] Farkas, op.cit., p.35
[34] Kaye, op cit.

going back to basics and building the new embouchure up. It will also take time for the musculature to readjust itself to the new set up of a new mouthpiece.
Compressing metal against teeth and flesh to firm the lips and reduce the size of the aperture is a flawed method of playing the instrument. Consistent use of excessive mouthpiece pressure will eventually cause damage.
Dr. McGrail, a leading authority on lip injuries notes that "It's not how long you play, it's how you play. If your technique is not good, problems will begin".[35] The "problems" Dr. McGrail describes however will occur over extended periods of consistently poor technique which can inevitably lead to injury. Poor technique in the short term over the course of a rehearsal or concert will not affect the embouchure severely.
Finally, I have brought a failure to warm-up correctly forward as a reason for injury after examining the case of Freddie Hubbard. John Faddis comments that "Freddie used to pick up the horn without warming up and he would just blow as long and as hard as he could".[36] Hubbard did not incur a lip injury until 1992, he suffered it competing in a high-note cutting contest which no doubt put massive strain on his lips.[37]
Faddis observes that jazz players tend to incur more injuries than orchestral players for the simple reason that a lot of jazz players do not have any formal tuition when they begin.[38] He argues that because a lot of jazz players pick up the instrument and teach themselves how to play, their technique is not very good and their mouthpiece position favours one lip. He compares this with the standard orchestral player who probably spreads the mouthpiece evenly over both lips.
Before any woodwind player begins to play they will always wet their reed. The same is true of many brass players, who will wet their lips before starting to play. There are some players however play dry. Farkas observes that the dry lip method causes the mouthpiece to stick to the face as there is no moisture to allow the mouthpiece to slide around. Farkas argues that a very accurate positioning of the mouthpiece can be achieved on wet lips.[39] Furthermore he goes on to say that dry lip players are more prone to sores, lesions and raw spots on the lips because the "constant applying and removing of the mouthpiece....with its attendant tiny, but apparent pulling sensation...can finally cause an abrasion to the skin".[40] Farkas observed that he only ever came across dry lip players who had a lip injury.[41]

Injury Conclusion

It is safe to say that there is a direct link between extreme playing and injury. Injury will only occur however if extreme playing is achieved through poor technique, whether it be the faults I have discussed above or any other number of variations. It is of great importance therefore to understand how the embouchure works and to periodically scrutinise one's own technique to make sure that nothing undesirable has crept in. Pressure and large amounts of musculature tension are two elements that can leave the lips exposed to the mouthpiece. If we couple high playing with long periods of playing, the lips will soon suffer. If we now add into the mix a player who has poor technique and will really strain the embouchure going for the high notes, it is plain to see why lip injuries can occur and why it is important to be aware of such things.

[35] Milkowski, op cit.
[36] Ibid
[37] Ibid
[38] Ibid
[39] Farkas, op cit., p.36
[40] Ibid
[41] Ibid

It is also important to remember that rest can be as important as practice. There is no point having a long practice session the morning after a long concert as the embouchure will not have recovered. Instead, let us think about the embouchure as we would any other muscle. Resting the embouchure by not playing, and allowing it to recover will mean that when the muscles are used they will have fully regained their strength again.

Trumpet History: pre-20th Century

The trumpet has been around for thousands of years beginning as a much simpler design. Early trumpets had an important role in ancient society as an instrument of nobility and majesty whose role was to declare war, reside over ceremonies and celebrations, as well as political and religious institutions.[42] People have been blowing into animal horns and seashells since the earliest civilizations. Once metal working was discovered, however, it was found that blowing down a metal tube was more resonant. Also, the shape, design and size could easily be altered. Most nations have their own trumpet heritage, each design unique and slightly different from the next whether in pitch or timbre, the only continuity between them all is the way they are played.

It was not until the nations of Europe had made contact with the Romans that the people of Europe were more or less unified in their basic design of the trumpet, modifying it according to traditional and national taste.[43] Dauverne's extensive historical summary mentions that the Romans had taken their design of trumpet from the ancient Greeks. According to ancient Greek poems, the son of Hercules and Omphale, Tyrsensus invented the trumpet in a part of Italy once known as the Tyrrhenian[44]; today known as Tuscany. The Greeks called Tyrsensus' trumpet the *Salphinx*, the Romans' larger and louder trumpet was called *"Tuba"*.[45] The general design of the *Salphinx* was bronze, "straight and slightly flared...about one and a half metres long" [46], "whose bell was turned out like that of our present-day trumpet, giving forth a very high-pitch sound" [47]. It is generally considered that the *tuba* is the ancient ancestor of the modern trumpet.

The Guild

Having enjoyed new experiences during their contact with Middle Eastern civilizations[48], the crusaders returned home bringing with them a form of trumpet and drum ensemble which would become very popular in Europe during the Baroque period.[49] [50]
The ancient German kingdom of the Holy Roman Empire lead the way with regard to trumpet and kettledrum music.[51] The majestic sound of trumpets and kettledrums played together granted the instruments a high place in the musical hierarchy, favour of the nobles, and all the privileges that would accompany this. It was only when these privileges were being lost, around the time of the Reformation (1517) that the musicians of Vienna and Dresden courts addressed the issue to Emperor Karl V (1519-1556).[52] An imperial decree was issued restoring the musicians' rights. It was continually supported throughout the 16th century until Emperor Ferdinand II in 1623 formed the "Imperial Guild of Court and Field Trumpeters and Court and Army Kettledrummers". Members of

[42] F. Dauverne: "Method for Trumpet" *Brass Society Journal* (1991), p.185
[43] Ibid p.200
[44] Ibid p.192
[45] Ibid p.196
[46] R. Meucci: "Roman Military Instruments and the Lituus" *The Galpin Society Journal* (1989), p.86
[47] Dauverne, op. cit., p.192
[48] C. Titcomb: "Baroque Court and Military Trumpets and Kettledrums: Technique and Music" *The Galpin Society Journal* (1956), p.56
[49] Ibid
[50] A. Baines: "The Evolution of Trumpet Music up to Fantini" *Proceedings of the Royal Musical Association* (1974-1975), p.3
[51] Titcomc, op cit., p.56
[52] Ibid

the guild enjoyed many privileges, strengthening the position of the guild to the point that noblemen did not see joining the guild as below them.

Trumpets of this time were long, straight and metal. This characteristic long tube shape is because the instruments were normally pitched in D, a sixth below the modern tuning of Bb.[53] Even as early as this, crooks were sometimes used to lower the pitch to C.[54] The natural trumpet had no valves, and no way of changing the length of the tubing to allow diatonic or chromatic playing, limiting it to a single series of harmonics. The player had to be of the utmost skill to compensate for such limitations. It is clear to see why aspiring members of the Guild had to undergo an apprenticeship for up to seven years, followed by an examination and oath of secrecy before they were allowed to join.[55] The oath ensured that their "secret" techniques could stay within the guild and stop anyone outside learning their secret art. These "secret" techniques included; double and triple tonguing, flutter tonguing and lip trilling.[56] Due to the limitations of the instrument, coupled with its rebellious nature, the Guild trumpeters were not required to master the entire range of harmonics but were assigned a portion of the range and played the parts within that range.[57]

Bass: This player would play the lowest parts normally doubling the kettledrums, sounding only the tonic and dominant. The notes c-g-c' would be heard from the bass trumpeter.[58]

Prinzipal: This player would play in the middle of the range. Prinzipal trumpeters were expected to play between g-c'".

Clarin: This player had the difficult job of playing the harmonics that fall very close together in the high register of the instrument, allowing them to form melodies. Clarin trumpeters were expected to play as high as c'" (16th harmonic) with ease, as this art form developed they were expected to reach higher. Another closely held secret of the guild was this ability to play in the extreme register of the instrument due in part to the type of mouthpiece; a much shallower-cupped mouthpiece with a wide rim was employed allowing the upper register to be reached with a relative amount of ease.

Trumpet ensembles accompanied by kettledrums were commonplace during this period. They would play for many noble occasions but were forbidden to play at more "common" occasions like fairs, festivals and public dances.[59] These ensembles would sometimes double certain parts, most notably, two clarin players would play the top part. The reason for this was two-fold; the clarin players would normally play together in harmony, the harmony part being improvised in thirds with the main melody.[60] Also, two clarin players meant that the highest parts could be shared to minimize fatigue.
Pieces written for trumpet ensemble were harmonically simple due to the limited notes that could be played. It was discovered however, that certain notes outside the harmonic series could be played by adjusting the embouchure to flatten or sharpen a note. It was found that the 11th harmonic falling between f" and f#" could be "lipped down" to an f", or "lipped up" to an f#".[61] John Wallace cites the

[53] Ibid, p.66
[54] Ibid
[55] Ibid
[56] Ibid, p.70
[57] Ibid, p.68
[58] Ibid
[59] Ibid, p.58
[60] Ibid, p.73
[61] Ibid

"Italian trumpet innovator Girolamo Fantini (1600-1675)"[62] as a player who is said to have mastered this technique. Reports of him at a performance in 1634/1635 comment on his ability to play notes in between the 3rd, 4th, 5th, 6th, and 7th harmonics which lie in the middle register of the instrument.[63] The use of such "lipping" effects shows that the trumpet players of the time were trying to find new ways to push the music.

The first printed trumpet music was for the opera "Orfeo" by Monteverdi composed in 1607. The trumpets open the work with a toccata; a fanfare-like flourish that would "prelude dramatic performances on important occasions when royalty was present".[64] This fanfare gives us a valuable insight into the music of the guild as it is regularly performed today (occasionally on period instruments). Monteverdi scores his opening toccata for four trumpets; clarino, "quinta", "alto e basso", and "vulgano". Titcomb comments that a kettledrum would also accompany the trumpets but is not included because it was taken for granted.[65]

The fanfares and flourishes of trumpet music through the Baroque period were often improvised. It was also commonplace for instrumentalists to double as composers, writing for their instrument. I have already mentioned Girolamo Fantini who wrote and played sonatas for trumpet and organ. John Wallace also cites Cesar Bendinelli and Pavel Josef Vejanovsky who were both significant players as well as composers.[66] Wallace argues that change came during the end of the 18th century as the composer/instrumentalist role declined and composers wrote for specific players.

Natural trumpets continued to be used throughout the Baroque, classical and early romantic period despite their limitations. Vivaldi, Telemann, Handel and J.S. Bach all wrote music for trumpets in solo and orchestral works. The difficulty of such pieces by composers of this period suggests that they were composed for specific virtuoso players. An example would be that the trumpet part of the second Brandenburg Concerto by Bach was intended for the court trumpeter in Cothen, Johann Ludwig Schreiber.[67] There is no doubt that he would have been a clarino specialist to play such a high and technically difficult part. Highly skilled trumpet players were rare. This is why composers rarely wrote for the instrument and why they would have specific players in mind. We can also be sure that the guild would only allow the most skilled to be clarino players, meaning their numbers must have been small. The Baroque clarino style of playing must have slowly died out due to the lack of players who could do it. By Dauverne's time the skill must have completely died out, for he states that; "The great masters have written Oratorios in which exist solo Trumpet parts of prodigious difficulty in regard to the elevation of the notes, which it would be almost be impossible to be able to produce today in an acceptable manner".[68] Dauverne also comments that the later abandoning of this type of playing was due to the insecurity of attaining the high notes and that this lack of "precision resulted in later abandoning this kind of performance".[69]

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[62] J. Wallace: "The Emancipation of the Trumpet: Louis Armstrong, and the influence of jazz on 20th Century Trumpet Performance and Composition" *Scottish Music Review* (2007), p.71
[63] Ibid
[64] Titcomb, op cit., p.72
[65] Ibid, p.69
[66] Wallace, op cit., p. 74
[67] E. Tarr: "Reiche, Gottfried" *Oxford Music Online*
[68] Dauverne, op cit., p.206
[69] Ibid, p.207

Unfortunately, the Guild was doomed to failure from the outset and its official demise came in 1810 by Friedrich Willhelm III.[70] The Guild's obsession with secrecy and nobility meant that its secrets and traditions were eventually lost. The secrets of clarino playing seems to have died out with the guild too, leaving a void in trumpet repertoire. The trumpet's place in the orchestra moved toward support, helping to enlarge the sound of the orchestra at cadences, and generally away from any sort of melodic responsibility. In this way, the instrument's limitations had finally caught up with it, becoming more apparent as the focus on instrumental virtuosity was shifting.

The Keyed Trumpet

The discussed limitations of the natural trumpet drove the development of a new instrument at the end of the 18th century by Anton Weidinger who sought to re-ignite the trumpet's soloistic popularity. The Keyed trumpet took its technology from woodwind instruments; holes were pierced in a coiled natural trumpet and leather pads attached to spring mounted keys. Inherent flaws with the design meant that the tone of the instrument was not as full as the natural trumpet, nor was pitch or tone consistent through its range. Natural trumpet players were therefore sceptical of the new technology as the keyed instrument, although attempting to solve problems, would sacrifice the defining feature of the trumpet.
The two most famous pieces originally written for the keyed trumpet are Haydn's trumpet concerto and Hummel's trumpet concerto. These pieces show off both its melodic and technical capabilities, new and old; including lip trilling, high playing, low chromatic playing and double/triple tonguing. High playing was indeed capable on the instrument as Haydn's concerto reaches up to a Db''' at its highest point. Tuning in this register must have been difficult though.
With the invention of the valve, the problems of the keyed trumpet were finally solved and the trumpet became a truly chromatic-capable instrument.

Did technical ability increase in parallel with the technological development of the instrument?

The natural trumpet was in wide use for approximately two hundred years. New techniques were inevitably developed to overcome the limitations of this basic instrument. The skill of lip bending for example meant more notes became possible, an altered mouthpiece design meant that high notes could be attained more reliably and new ways of tonguing attempted to make the instrument more versatile.
With the addition of keys and valves, technological limitations had finally gone and brass players began to revel in an instrument with as much musical freedom as a string instrument. We must remember that extreme high playing had been majorly in decline with the invention of the keyed trumpet. When we get to the age of Dauverne, (1799-1874) who was the first to use the F three valve trumpet in public performance in 1827,[71] he comments that only those gifted few could securely play high as it was so difficult and therefore rarely used.[72] We can draw parallels from this with that of the Guild, where only the gifted few were allowed to be clarin players. Clearly, technological improvements were not going to help a player reach the extreme range. Dauverne *was* aware of varying mouthpiece sizes to aid in range, but from his method he comments on the feeble tone quality

[70] Titcomb, op cit., p.57
[71] E. Tarr: "Dauverne, Francois Georges Auguste" *Oxford Music Online*
[72] Dauverne, op cit., p.242

of using small mouthpieces.[73] Technical ability does not revolve around range however, and the invention of the valve brought about new and different heights of virtuosity on brass instruments as very fast passages could now be played. The quest for high notes no longer interested players as melodies could be played easily in the lower register of the instrument. Speed and dexterity were what players now desired.

There is a large cross-over of technology between the trumpet and cornet during the 19th century. The cornet came into existence by placing holes and keys on the bugle. When valves were invented, they were added to the circular post-horn,[74] and a more ergonomic design was developed into the modern "cornet-a-pistons". Wallace comments that it was nearly the cornet that would dominate treble clef brass playing, due to the pace of the cornets technological advances and the technical capabilities of its players,[75] such as J.B Arban and H.L Clarke. Herbert Clarke was a player of this era who came to worldwide fame through his virtuoso displays on the cornet; he played in the marching bands of North America during the late part of the 19th century[76]. He composed much of the instruments standard repertoire, including technical exercises, and set new standards of playing on the instrument[77]. The extensive written legacy that Clarke left would be used by both cornet and trumpet players alike.

Trumpet players have been a conservative group as we have seen throughout the instruments history, firstly with the guild and then with the rejection of the keyed trumpet. Whilst Arban and Clarke were playing and writing music to show off their ever increasing technical capabilities, trumpet music remained grounded in "the ideals of the natural trumpet, with its idioms of war...and nobility"[78]. It is for this reason that technological features of the cornet were finding their way onto the trumpet in an attempt to make the trumpet more dexterous, whilst keeping its sound of beauty and heroism. The conservatives clung onto the long F trumpet for its noble sound, but toward the end of the 19th century and into the early 20th century the more compact Bb trumpet was becoming more popular.[79]

We can determine from looking into the past that as technology advanced, skill advanced with it. It is humbling to think that even hundreds of years ago brass players were not content with the limitations of their instrument, always pursuing new ways of playing.

[73] Ibid, p.228
[74] G. Monks: "The History of the Cornet, from Pre-History to the Present" *BlackDiamond Brass*
[75] Wallace, op cit., p.78
[76] Clarke: "How I Became a Cornetist", (1934) p.6
[77] Wallace, op cit., p.75
[78] Ibid, p.79
[79] Ibid

Jazz and the 20th Century

At its peak, jazz music and its many subsidiary genres would become the most popular form of music in America. The trumpet/cornet was a key instrument within the genre from the outset of the music's beginnings with such self-taught pioneers as Buddy Bolden and Freddie Keppard. As the music developed, new techniques were used and the next generation took the playing of their elders further. High playing started to be used in jazz toward the end of the 1920's as Louis Armstrong's technical ability grew to new heights. Others would imitate him and the technique would subsequently branch out and flourish within the genre, eventually re-igniting the technique's use amongst trumpet players.

Louis Armstrong (1901-1971)

It is impossible to speak of jazz and not mention Louis Armstrong; it is his face that has become synonymous with jazz. Panassié notes four basic periods of his playing career in relation to his playing style and technical ability. Using these four periods as a basis however, I have added my own observations about these periods:

1. **1916-1927**
   Resembles many other great New Orleans trumpet players of the time. Although he has not yet found his own style, his playing is more brilliant than most. "His solos, while basically sober, were infused with excursions into the high register, and filled with rapid phrases requiring the most intricate execution."[80]

2. **1927-1931**
   He is still rooted in the New Orleans style and technique but is at a highly creative point of his playing life. His invention seems limitless, facilitated by the "frightening fluency of his technique."[81]

3. **1931-1935**
   This period of Armstrong's playing is dominated by extreme register playing. Although Panassié comments that these displays of vulgar virtuosity did not detract from his creativity,[82] other authors suggest that these displays are merely crowd pleasing devices, and that by this point he had lost his imaginative skill of the 1920's. In any case, his technique had reached its absolute pinnacle by this period.

4. **1935-**
   This final period is very different from those preceding it, by this point it is as if Armstrong returns to basics and strips down his improvisations to their bare essentials. "He states his

[80] H. Panassié: "The Real Jazz" (New York, 1942), p.80
[81] Ibid
[82] Ibid

> theme simply, modifying it here and there with touches that give the most uninteresting phrases a beauty which transfigures them".[83]

Although a good basis for comparison in broader terms, to attempt to analyse the development of Armstrong's technique we must examine in more detail his playing during these periods. We must also look back to his early life and attempt to trace how he started learning the cornet.

Early Days

Armstrong learned to play cornet in the Coloured Waifs Home for Boys. He started learning various instruments, as playing music was a reward for good behaviour;[84] beginning on the tambourine and moving onto the snare drum, alto horn and bugle.[85] With the bugle's limited playing possibilities, Armstrong had to master playing the fundamentals of the brass instrument before being allowed a cornet. Armstrong recalled learning bugle calls like "Reveille, Taps and Mess Calls" [86], indicating that he must have had a certain amount of range and flexibility in his playing. Once he moved onto the cornet he quickly excelled on the instrument, learning to read music-and becoming familiar with the popular march tunes and brass band repertoire.[87] After leaving the Coloured Waifs Home the young Armstrong was taught by Joe "King" Oliver.[88]

Armstrong first appeared on record in 1923 playing second cornet to Oliver. Brooks argues that evidence from the recordings of the band suggests that Oliver would always take the lead role, only allowing Armstrong a small number of solo breaks and leads [89]. It is difficult therefore to analyse Armstrongs' high register playing from 1923 as there is no evidence of it from his small number of recorded lead parts, and his second cornet role does not allow it.
Armstrong left King Oliver's band at the end of 1924 pushed by his new wife, Lillian Hardin who wanted him to continue his career as a first cornet player. Armstrong moved to New York and joined Fletcher Henderson's band as first cornet.

Expanding Technique:

Most critics consider Armstrong's work during the 1920's as his best, especially as he reached the end of the decade with the Hot 5 and Hot 7 recordings. The reason for this is his creativity and originality, his many records from this period give evidence of this showing a natural progression as he matures and finds his sound. During the 1930's however, Armstrong enjoyed stardom on a scale only known to few, and because of this many critics believe Armstrong became too commercial and sold out his musical integrity. Playing in the extreme upper range of the trumpet is a feature of Armstrong's technique that builds very progressively through this period until its peak during the 1930's. Using his extensive recording library during the 1920's and 1930's we can begin to trace how his range expands and how he uses it.

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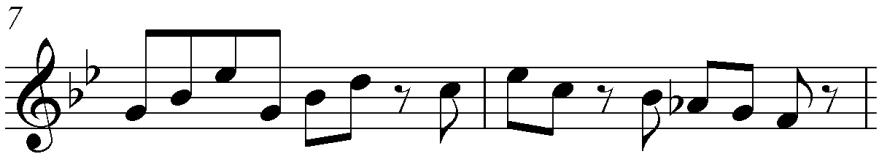
[83] Ibid
[84] M. Jones & J. Chilton:"Louis: The Louis Armstrong Story 1900-1971" (London, 1971), p.50
[85] Ibid
[86] Ibid
[87] Ibid, p.52
[88] Ibid, p.53
[89] Brooks (2002), op cit., p.61

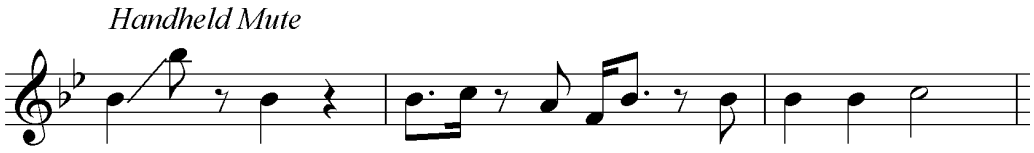
One of Armstrong's earlier recordings with the Fletcher Henderson Orchestra is *Tell me Dreamy Eyes*[90] (10/10/24). Armstrong takes two solos and can be heard with a fixed mute occupying the top texture of the band. His first solo is bouncy and light containing some fast licks, musical example 1 shows bars 7 and 8 where his use of arpeggios to outline the chord is executed flawlessly at fast tempo.

Musical Example 1:



Clearly, Oliver's earlier instruction of play fewer notes and "more lead" [91] had already been lost from Armstrong's mind. This solo although quite fast in respect to fingers does not go above an F" (assuming concert pitch). Armstrong's second solo, shown in musical example 2 comes near the end of the piece, remaining in a similar vein to the first except for the opening cornet break. This two bar break begins with an octave rip from Bb' to Bb", his largest rip on record to date.

Musical Example 2:

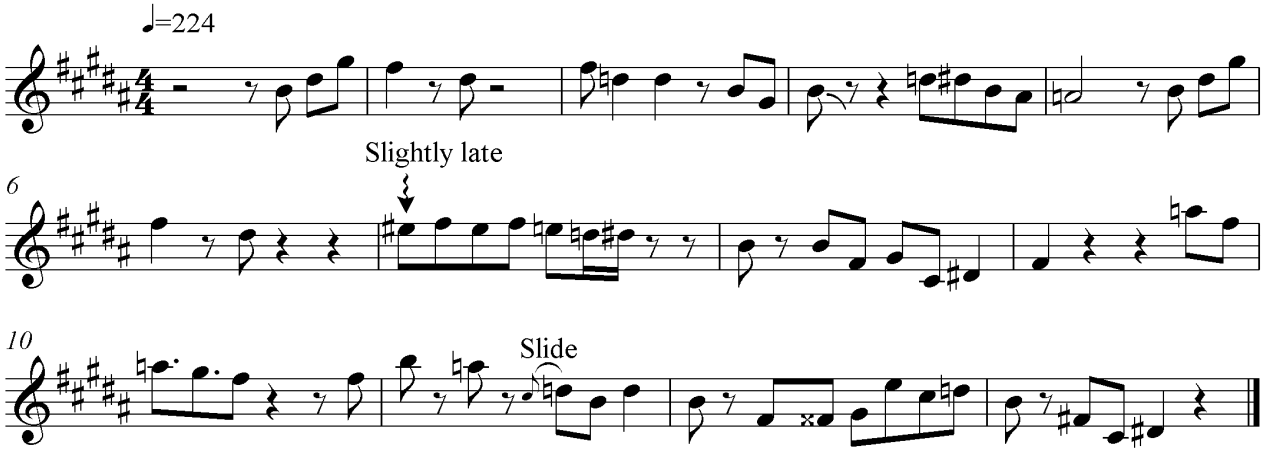


This early example points to what is to come in regard to Armstrong's boldness and his technique. The swagger of his sound throughout both solos also sounds like he now feels more confident.

Thirty days later, Armstrong records *Copenhagen*[92] (30/10/24) with the Fletcher Henderson Orchestra. Musical example 3 shows Armstrong's solo during this piece. It is full of interesting features and shows him reach slightly higher than he has done before. Beginning with a call and response motif, the call stretches up both times to a G#" and the response answers in a downward motion.

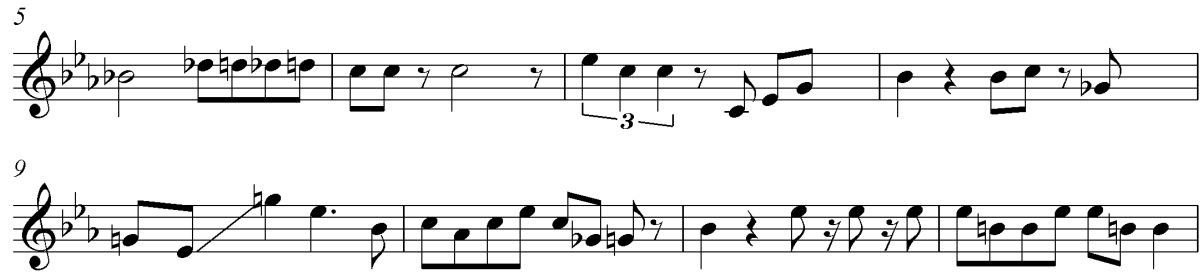
[90] CD: Track 1
[91] Jones & Chilton, op cit., p. 53
[92] CD: Track 2

Musical Example 3:



Bars 9, 10 and the first half of bar 11 are all contained in the upper register between F" and B", showing that Armstrong is slowly becoming more and more comfortable using this range.
It is interesting to note that although almost identical there are small differences between the two takes of this solo recorded at this session. In the second take Armstrong produces a thin sounding A natural in bar 9 and also splits the first note of bar 10.[93] This adds further evidence to show that, although gaining confidence, Armstrong is still not fully secure in his pitching in this register. Fatigue could also be a reason for the discrepancies.
In the next month, the Fletcher Henderson Orchestra cuts *Naughty Man*[94] (14/11/24) which shows the effortlessness of Armstrong's playing. Brooks comments that so far in his career, this solo contains Armstrong's largest range on record, occupying two octaves from Bb to Bb".[95] The most impressive part of this solo is Armstrong's fluency in moving between the registers of the instrument. Musical example 4 shows that in bar 9 he performs a rip from E' to G" (concert pitch). This rip of a tenth is executed within the middle of a phrase and is flawless, moving between the notes in perfect time and not hitting any unwanted harmonics along the way.

Musical Example 4:

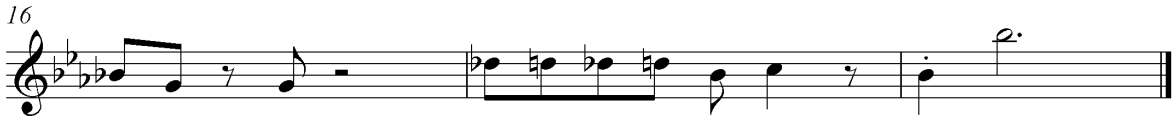


I believe Armstrong would have probably used a false fingering for this rip as using the third valve to slide up to the A natural (Bb pitch) makes the rip a lot cleaner sounding. Musical example 5 shows the final bars of this solo, further illustrating the virtuosity at work within Armstrong as he performs a

[93] Brooks (2002), op cit., p.120
[94] CD: Track 4
[95] Ibid, p.131

perfect octave leap from Bb' to Bb". Once again this leap is executed flawlessly, the sound of the Bb" is full and makes use of Armstrong's trademark "terminal vibrato".

Musical Example 5:

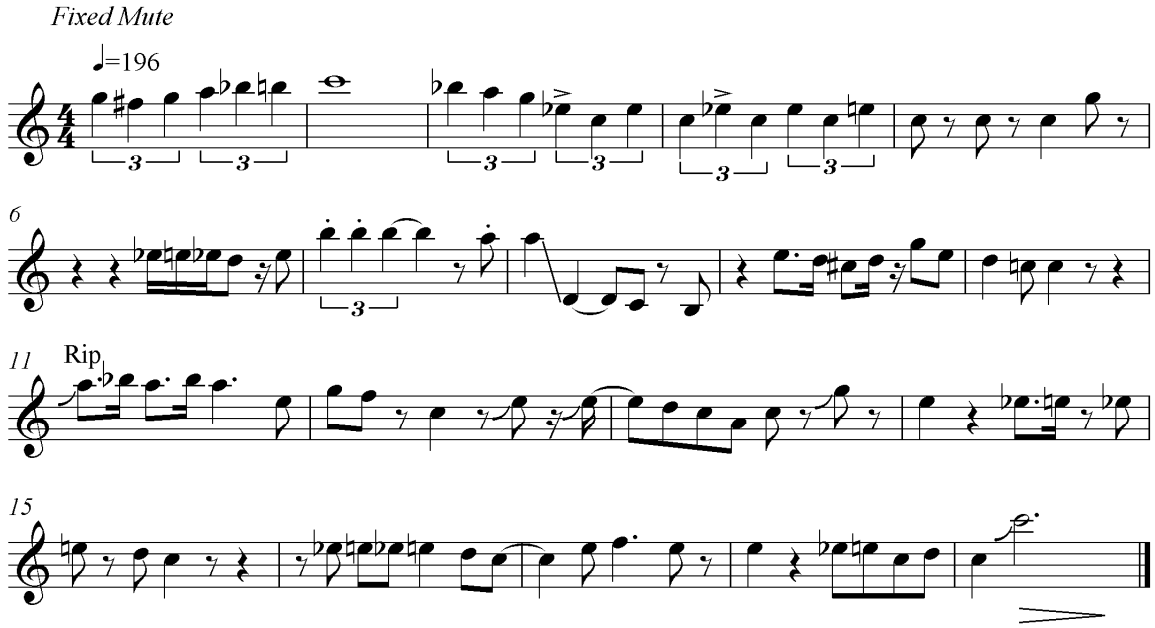


From this solo we can see Armstrong's capabilities, his sound is unhindered and he is able to move up and down the trumpet range easily.

By the end of 1925 Armstrong had improved his range, using it more effectively and more frequently. Evidence comes from his playing on *I ain't gonna play no second fiddle*[96] (02/11/25) with Perry Bradford's Jazz Phools. In his solo, shown in musical example 6, Armstrong pushes his capabilities and technique to their full. Although Panassié describes this period of his playing as "sober",[97] such a description can hardly be true of this solo with its energetic character. Armstrong's power overwhelms the ensemble; it is difficult at parts to pick out the other components being played. His solo begins with a chromatic triplet rise to the highest note of the solo a Bb" which he holds for four beats. Armstrong descends back down in a similar rhythmic fashion, outlining the minor and major possibilities of the tonic chord. In bar 7, Armstrong returns to his triplet idea, this time just using a single note of A". In the next bar, he slides down from a G" to a C, a rather large slide which is made unusual by the fact that Armstrong normally slides upwards. This slide does show once again his fluency in moving between registers. He also makes this slide a feature as he fills in the gap between the note with an exaggerated, almost comic sounding descending glissando. For the final bar of this solo, Armstrong uses his octave leap trick that he made use of during the final bar of *Naughty Man*[98] (14/11/24), once again the Bb" is full of vibrato.

[96] CD: Track 5
[97] Panassié (1942), op cit., p.80
[98] CD: Track 4

Musical Example 6:

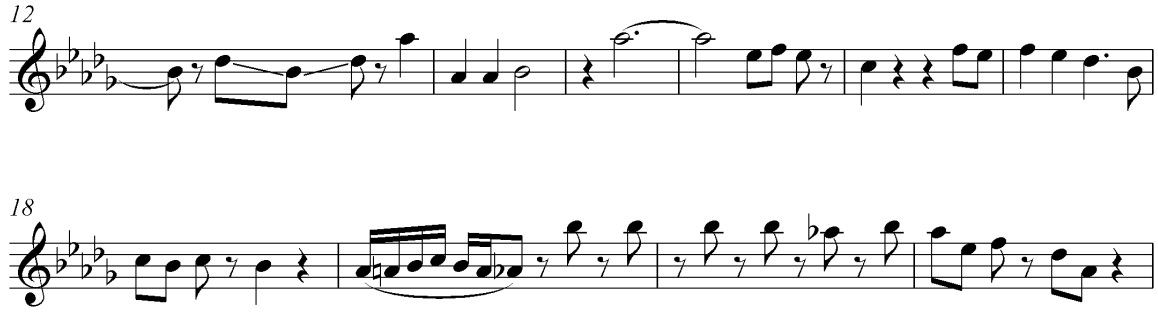


Compared to his earlier works which we have examined, Armstrong's fast fingered licks are no longer present, replaced by more rips and confident excursions into the higher register of the instrument. Brooks comments that it could be during this recording session that Armstrong made his first use of the trumpet.[99] The sound of the instrument, although muffled slightly by a fixed mute does sound much more vibrant. The high notes especially help Brooks' case as they would not sound as piercing when played on a cornet. Wallace disagrees however with this observation remarking that it was not until 1927 that Armstrong moved onto the trumpet when he had taken "his cornet playing to its limits".[100] It could be that Armstrong might have been experimenting with the trumpet at this early date as the Bb instrument was becoming more and more popular.

Two months later Armstrong cuts *Static Strut*[101] (28/05/26) with Erskine Tate's Vendome Orchestra. This is another good example of an Armstrong solo contained mainly in the middle and upper register of the instrument, illustrated in musical example 7. It is full of rips and effects of the same nature as *I ain't gonna play no second fiddle*[102] (02/11/25). Although most of the solo is executed well, some of the faster runs suffer as Armstrong's fingers struggle to keep up with the fast tempo; over 200 bpm. The solo therefore has a rushed and agitated feel to it. His trademark long held high note is present in an Ab" held for five beats from the second beat of bar 14 until the third beat of bar 15. It is played as usual with lots of vibrato and has a full sound. During bar 19, we can see another example of Armstrong's impeccable control of pitching, changing from one range to another easily. He leaps just over an octave having executed a fast chromatic semiquaver run to land on a syncopated Bb" and repeat the note a number of times before descending back down.

[99] Brooks (2002), op cit., p.268
[100] Wallace, op cit., p.79
[101] CD: Track 6
[102] CD: Track 5

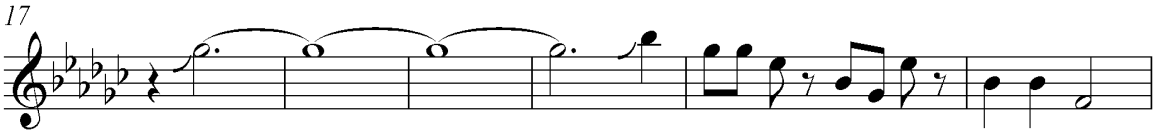
Musical Example 7:



A word must be said at this point about stamina. This solo is thirty six bars long and as previously stated mostly contained within the higher register of the instrument. If we compare this solo to that of *Tell me Dreamy Eyes*[103] two years earlier it is clear to see the differences. Armstrong's comfortable playing range has increased and his upper register notes no longer sound weak, he is also able to sustain his energetic sound for a much longer time.

As 1926 goes on, Armstrong appears to be pushing his range upward once again. *The King of the Zulus*[104] (23/06/26) is an example of this with Armstrong consistently hitting Bb". His solo of thirty two bars is another long one, with very little in the way of opportunities to break contact between instrument and lips pointing out his increasing stamina. The slower tempo of this piece, coupled with its minor tonality also gives Armstrong a lot of scope for interesting phrases. His trademark long high note is used once again, this time he holds a Gb" for fourteen beats, shown in musical example 8. He then rounds it off with a rip up to a Bb" and from there continues playing, his only substantial rest of two beats coming five bars later.

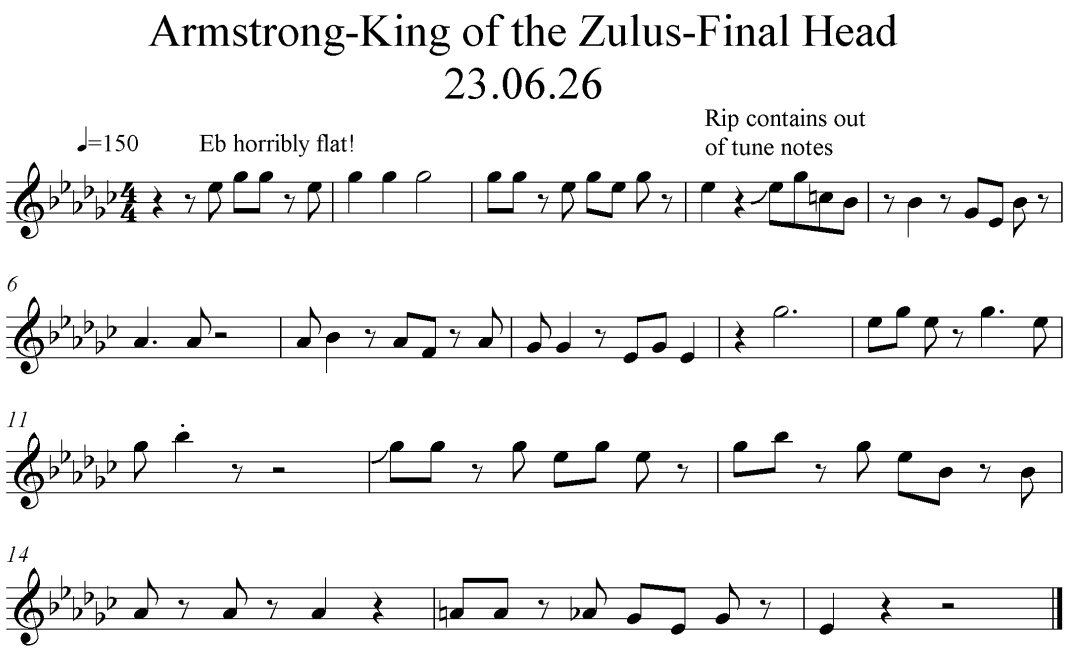
Musical Example 8:



The final head of this piece (musical example 9) is also of interest as Armstrong sounds quite tired by this point. Armstrong's opening Eb" is quite flat and his tone begins to sound forced after a few bars. Also, some of his higher notes are also slightly flat adding more evidence to support his fatigued state.

[103] CD: Track 1
[104] CD: Track 7

Musical Example 9:



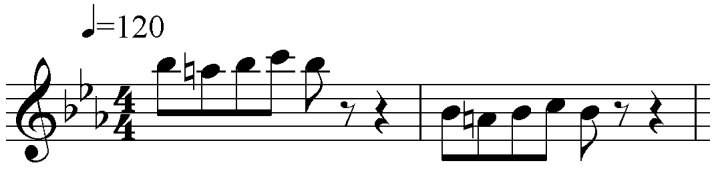
Armstrong continues to reach higher through 1927. His solo on *New Orleans Stomp*[105] (22/04/27) shows him reach a whole step higher hitting a C''' (concert pitch). The note is ripped up to right at the end of his solo sounding more like a comic effect than a display of virtuosity. Armstrong makes use of the octave jump to finish off his solo, the rip effect allows him to be a bit lazier with his pitching as he does not tongue the C'''. Generally however the fast tempo of the piece once again detracts from the fluency of Armstrong's playing.

The next time Armstrong hits another C''' is two weeks later on the second recording of *Wild Man Blues*[106] (07/05/27) made by the Hot 7. In a similar fashion to *New Orleans Stomp*, Armstrong hits these C''' by ripping up to them, perhaps he does not yet feel secure enough to tongue them. In bar 27 Armstrong uses his trademark long held high note holding an Ab" for three beats. A running theme with this feature appears to be that Armstrong will almost always allow himself a beat rest before he goes for the note. The reason for this is probably twofold; to allow himself a beat to take a large breath and to break contact with the trumpet to briefly relieve the pressure on the lips. In bar 28 Armstrong uses another recurring trick to help him get the C''', ripping up to it from his long held Ab" of bar 27. This solo is another testament to Armstrong's ever increasing stamina as his solo is forty one bars long with no more than the odd crotchet rest. Also when we consider that the speed of the piece is 105 bpm, Armstrong plays continuously for almost two minutes.

Twelfth Street Rag[107] (11/05/27) shows Armstrong reach his highest note to date on record. Brooks describes his solo as messy[108] but I believe the untidiness of the solo adds to the cheerful feel of the tune. Armstrong begins with a two bar introduction, shown in musical example 10. He plays the opening riff in the upper register of the instrument, reaching up to a high C''', then plays the riff down an octave. A bold opening when we consider the length of Armstrong's solo, and that three records were cut at this session, all of which Armstrong plays in the upper register for.

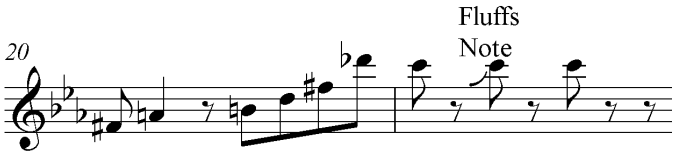
[105] CD: Track 8
[106] CD: Track 9
[107] CD: Track 10
[108] Brooks (2002), op cit., p.394

Musical Example 10:



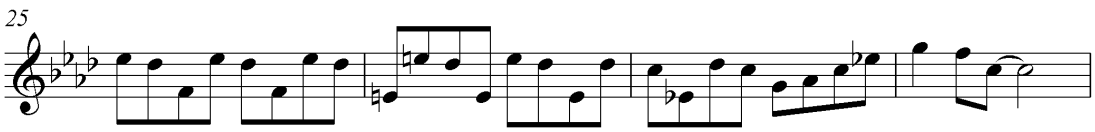
After some initial interesting rhythmic devices and his normal bag of tricks Armstrong reaches up to a Db''' in bar 20, his first use of this tone on record (musical example 11). The note does not sound strained or choked, and most importantly it is tongued, not ripped up to. This note is significant as it is high, confident and secure. Having hit the Db''', Armstrong settles back down to play three consecutive C''', the first and last are flawless but the middle one is miss-pitched. This device of repeating high notes foreshadows his work and style of the 1930's.

Musical Example 11:



At the end of 1927 Armstrong records *Stuttin' with some BBQ*[109] (09/12/27). As Brooks comments, by this point Armstrong had become a solo figure, the rest of the ensemble are simply there "as a platform for Armstrong to perform upon....His trumpet is effectively the only instrument we listen to".[110] This piece is a clear illustration of the change happening in jazz during this period, moving from a focus on the ensemble to a focus on a gifted individual. The abundance of high notes and the consistency with which Armstrong plays them distinguishes this solo from previous examples. There are not many miss-pitched notes and his higher notes ring with a vibrato that could only be Armstrong. Bar 4 of the out-chorus shows this perfectly with Armstrong hitting two C''' in a row with the second being held a full three beats. If we examine the two halves of this solo, we can see that most of the high playing is contained within the first half. The second half contains more technical devices such as bars 25 to 27 (musical example 12) which resembles the kind of technical exercise that might be found in J.B Arban's method book.

Musical Example 12:



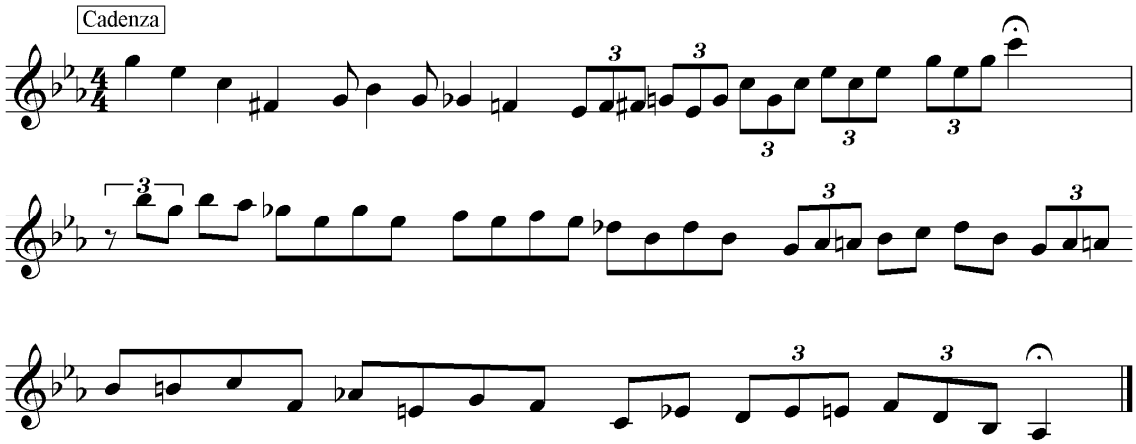
Having had the instrument on the lips for a while with no rest, Armstrong most likely does not feel secure enough to reach the heights obtained at the beginning of the solo. It is most likely due to stamina therefore as to why he sticks to more technical playing in the second half of this solo. It is only after the four bar ensemble break that he returns to his high notes having had time to rest.

[109] CD: Track 11
[110] Ibid, p.410

Armstrong is clearly aware of his own stamina and has a good idea of what is feasible to do by this point.

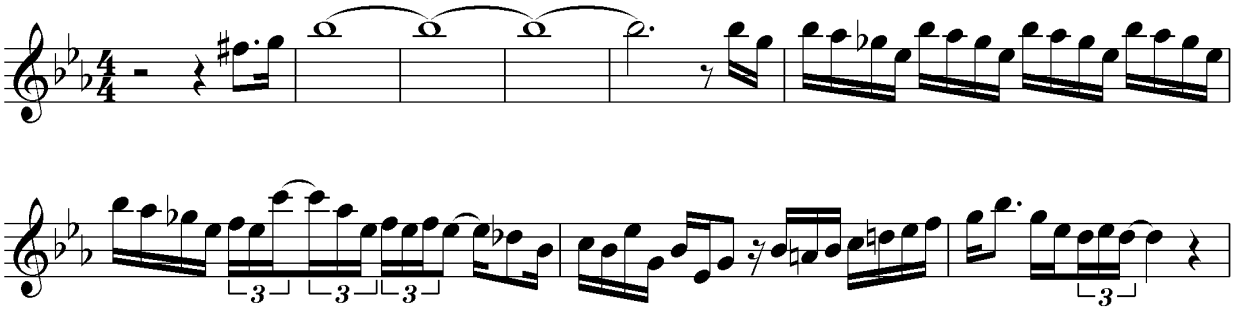
West End Blues[111] (28/06/28) recorded with the Hot 5 is generally considered to be amongst Armstrong's finest work. His highest note comes in the opening cadenza, illustrated in musical example 13, when he pauses on a C'", full of vibrato and energy. He then cascades back down from this note to land on an A. His fast runs are executed perfectly, all infused with Armstrong's character and sound.

Musical Example 13:



Musical example 14 shows Armstrong's solo. He begins his solo with his trademark long held high note, in this case a Bb" which is held for three bars and three beats. If we consider that the tempo of the piece is approximately 80 bpm; this is no easy feat. Out of this long note he plays a repeated descending phrase beginning on Bb" for a bar and a beat before reaching up to a C'" again. Armstrong's final squeeze from G" to Bb" finishes off the relatively short solo, almost all contained within the upper register.

Musical Example 14:

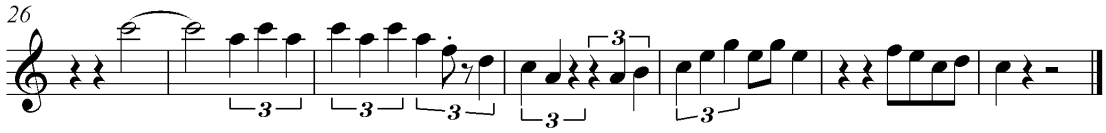


Armstrong's playing on this piece is an example of him at his peak, it comes at a point when he has developed as a player so much that whatever he sings in his mind, he plays. On the other hand, it also comes before his playing of the 1930's with its showmanship and crowd pleasing.
As a lot of Armstrong's recordings from 1928 became so popular he recorded various versions of them throughout his career giving us a valuable insight into how Armstrong's playing changed. One

[111] CD: Track 12

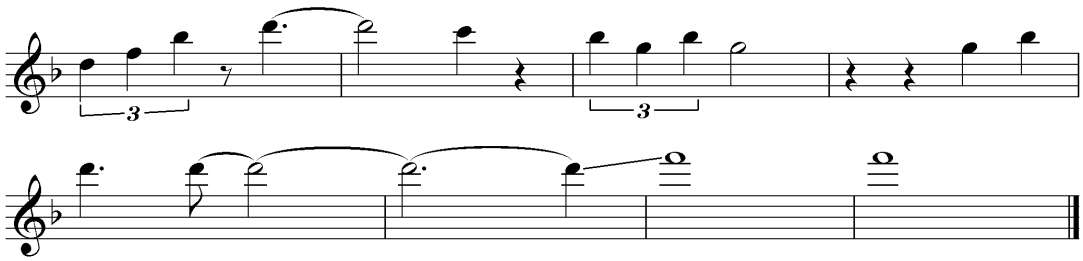
such record is *A Monday Date*[112] first recorded by the Hot 5 in 27/06/28. It is typical of this period with lots of interesting and creative devices, as well as the usual shakes, squeezes and rips. Musical example 15 shows Armstrong reach up to a C''' for his long held high note in this piece; holding it for four beats before going into triplets, moving back and forth between A'' and C'''.

Musical Example 15:



This solo is a full thirty-two bars long. Most of Armstrong's high playing is contained within the last eight bars, another demonstration of the incredible stamina he had built up by this point. If we compare this with the same piece recorded by Armstrong and his big band in 1939 there are many key differences. By this point the emphasis of Armstrong's music had moved from creative improvisation on his trumpet to showing off his astonishing technique in the upper register and singing. From his solo in 1939 it is clear that it is all about the high notes as he reaches up to notes that he never reached during his Hot 5 and Hot 7 days. His highest note is his final two F''' (musical example 16) holding each one for a full four beats which he slides up to from a D'''.

Musical Example 16:



Although the first half of the solo is partially reminiscent of Armstrong's style from the late 20's, the second half shows us what the pursuit of showmanship did to Armstrong. The fact that the solo is half as long as the 1928 version illustrates that improvisation was not the focus, it also shows us that his stamina may have been faltering by this point.

Armstrong's move from creative genius to showman began to appear during the beginning of the 1930's on recordings like *The New Tiger Rag*[113] (11/03/32). Panassié comments that Armstrong's soloistic displays merely show off effects that are possible on the instrument without bothering about musical interest.[114] Another example of this "commercial" sound is *High Society*[115] from 26/01/33. Armstrong is almost always contained within the upper register of the instrument, and makes use of lots of effects, in this case the repetition of the squeeze. His solo, although containing perhaps a couple of interesting phrases is submerged in effects that detract from the music. Panassié comments that in the past, he had ventured to the acute ranges of the instrument as a result of inspiration, "the

[112] CD: Track 13
[113] CD: Track 15
[114] H. Panassié: "Hot Jazz: The Guide to Swing Music" (New York, 1936), p. 61
[115] CD: Track 16

melodic development he was pursuing had naturally led him there".[116] We can cite many of his solos where this is the case: *West End Blues*[117], *Wild Man Blues*[118] or *Twelfth Street Rag*[119]. With the end of this period, from 1930 onward, Armstrong and his manager Joe Glaser "had found a successful commercial formula to exploit Louis's talents: from now on he was to play in front of various big bands.[120] The big bands would function as a platform for him to essentially show off and perform his "display pieces".[121]

Although most critics describe Armstrong's work from the 30's onward as "commercial" and "formulaic", what many fail to realise is that as a player Armstrong remained very consistent. The technical heights that Armstrong reached in the 1930's soon made their way into standard trumpet technique as trumpet players everywhere attempted to emulate Armstrong. Let us not forget that this period is not even one hundred years since Dauverne published his trumpet method book (1857) in which he comments upon high playing; "It should be noted that the artist who was charged with this first part barely obtained them (high notes), with a mediocre tone quality".[122] Armstrong was one of the first since the time of the Baroque court and military trumpeters to show that high playing could be done in a way that was brilliant in sound and could be consistently done. Brooks cites Armstrong's Musical Autobiography of 1956 in which Armstrong recalls that it was a trumpet player called B.A Rolfe who inspired him to play high notes after hearing Rolfe play *Shadow Land*.[123] This gives us evidence that high playing was being done around this time, even before Armstrong. It is clear however that it was Armstrong who popularised the technique amongst the masses and trumpet players alike. His fame and dazzling displays of high playing showed what the trumpet was capable of doing. From this point onwards, trumpet playing would never be the same.

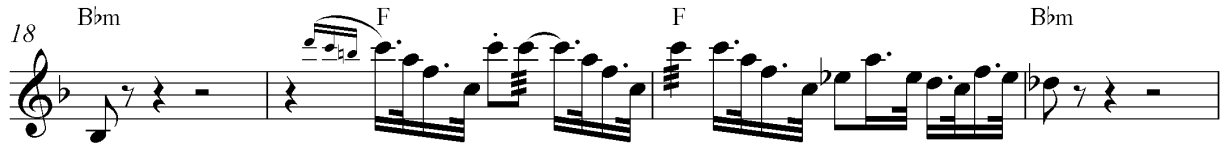
[116] Ibid
[117] CD: Track 12
[118] CD: Track 9
[119] CD: Track10
[120] G. Schuller: "Early Jazz" (New York, 1968), p.130
[121] Ibid
[122] F. Dauverne op cit., p. 225
[123] E. Brooks: "Influence and Assimilation in Louis Armstrong's Cornet and Trumpet work (1923-1928)" (New York, 2001) p.112

Roy "Little Jazz" Eldridge (1911-1989)

Roy "Little Jazz" Eldridge was a trumpet player of the swing era. He was a highly competitive player who would always be on the lookout for the next trumpet player to "cut" and force off the bandstand.[124] When speaking in terms of trumpet lineage, Eldridge lies in the generation after Louis Armstrong and therefore is vitally important in linking the sound of Louis Armstrong and Hot Jazz with the harmonically sophisticated Modern Jazz of the beboppers. Eldridge's focus was on improvisation and his solos possess endless examples of virtuosity including a very secure upper register, fast runs and a "daring harmonic sense that was a precursor to modern jazz".[125] Throughout his career Eldrige always played with the same fire and intensity that he did as a young man during the 30's, his competitiveness never diminished. This also meant that Eldridge would always go for his best in his solos, even if it meant "falling on his face".[126]

Eldridge's technically explosive sound came not from Armstrong, but from his rival Jabbo Smith who was one of the best trumpeters other than Armstrong during the 1920's.[127] Such was the case that the Brunswick record company recorded Smith for six months in an attempt to compete with Armstrong's best selling records.[128] Brunswick's attempt failed and Smith's records could not compete with Armstrong. Schuller comments that Smith was influenced by Armstrong, imitating a number of his solos, including *West End Blues*, but would carry the ideas one degree further in range and technical skill.[129] It is through Smith that Eldridge can be linked to Armstrong. Smith's records must have attracted the young Eldridge, who adopted some of Smith's technically explosive, chance-taking speed in the high register.[130] According to Eldridge, he lost a "musical battle" to Smith in 1930, Smith wore the young Eldridge out before the night was through.[131] No other trumpet player until Dizzy Gillespie could boast such an achievement. Smith's facility was so good that Schuller cites his stop-time break from *Till Times Get Better*[132] (04.04.29) as almost worthy of Eldridge or Gillespie.[133] Another example of his high register playing and technical command is his use of the tremolo effect in bar 19 and 20 of his solo on *Sweet and Low Blues*[134] (23.02.1929) shown in musical example 17.

Musical Example 17:

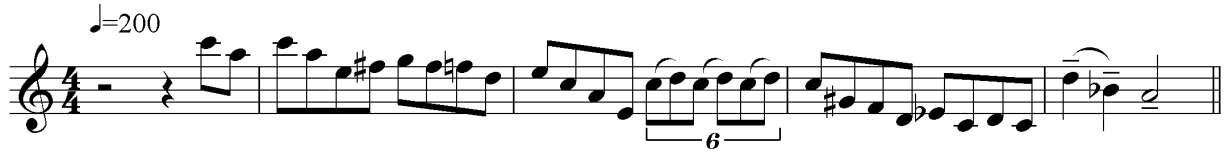


Eldridge's earliest recordings come from 1935 with Teddy Hill's Orchestra. By this point the young Eldridge was only 24 years old but already displaying an incredible technical facility. If we examine his solos on *Lookie, Lookie, Lookie, here comes Cookie*[135] this command of the instrument

[124] S. Barnhart: "The World of Jazz Trumpet" (Milwaukee, 2005), p. 199
[125] Ibid
[126] Ibid
[127] Ibid, p.192
[128] Schuller, op cit., p.210
[129] Ibid, p.211
[130] L.Weinstick: "Cladys "Jabbo" Smith (1908-1991)" *Red Hot Jazz Archive*
[131] Ibid
[132] CD: Track 17
[133] Schuller, op cit., p.214
[134] CD: Track 18
[135] CD: Track 19

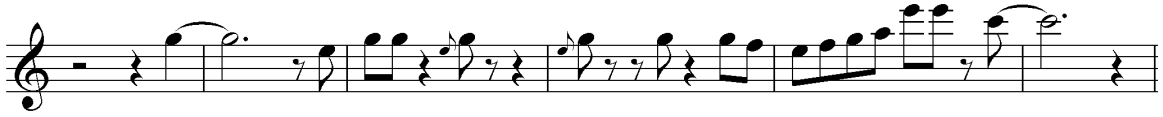
immediately becomes apparent. His opening trumpet break is shown in musical example 18; following the introductory chord sequence begins on a C''' and over the course of four bars moves downward with brilliant accuracy. The sextuplet of bar 3 also shows off his flexibility, slurring effortlessly between C'' and D''. This opening break is very similar in sound and style to Armstrong's *West End Blues*[136] which after its initial fanfare cascades in a similar way back down to the lower end of the instruments register.

Musical Example 18:



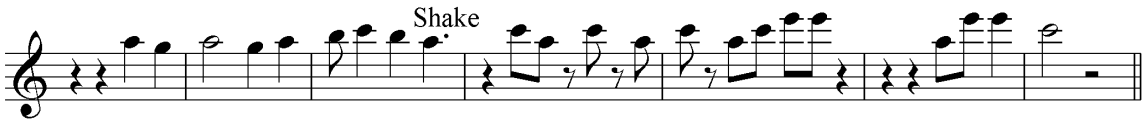
After renditions of the head from the band, Eldridge takes three solos. Each solo is in a call and response format with the band playing the first four bars of the head and Eldridge responding. This call and response format allows Eldridge to really make the most of his solos as it allows him rest, his excursions into the upper register therefore are used to great effect. During his first solo, he stays lower than the others, perhaps centring himself before the next two. His second solo is shown in musical example 19, beginning on a held G'', it is in a similar fashion to Armstrong's trademark long held note. Eldridge rounds off this short solo with a rising figure reaching up to an E''' before resolving onto a C''', holding it for a full bar.

Musical Example 19:



The two E''' quavers are tongued, in tune and confident. Eldridge's final solo (musical example 20) is slightly longer and does not go below a G''. Again, he reaches up to an E''' hitting four of them this time.

Musical Example 20:



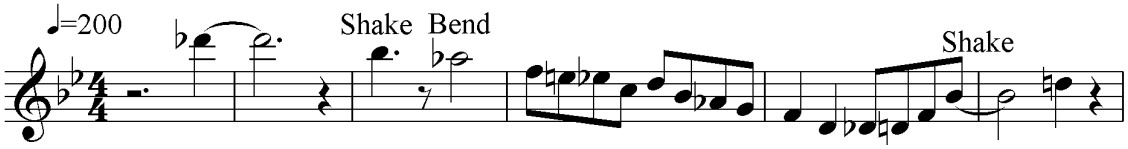
Once again, his highest notes are full and confident; they do not possess the energy and momentum that Armstrong's high notes had by this stage, but they show just how impressive Eldridge's technique was.

A year later, Eldridge began playing with the Fletcher Henderson orchestra as a featured soloist, much like Armstrong had done just over ten years earlier. *Christopher Colombus*[137] (27.03.36) not only shows off Eldridge's extreme range and stamina but also his inventiveness as a soloist. Unlike *Lookie,*

[136] CD: Track 12
[137] CD: Track 20

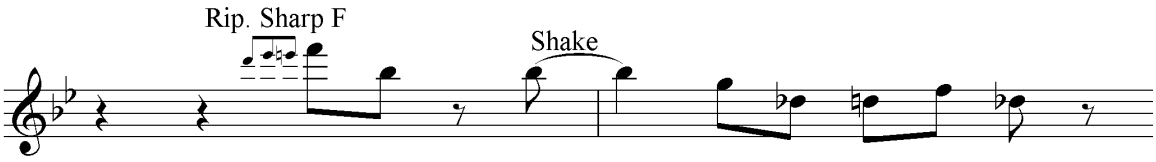
lookie, lookie, here comes Cookie[138], Eldridge has two solos in *Christopher Colombus*, the first is longer consisting of sixteen bars, the second comes eight bars later and lasts only eight bars. Eldridge begins his first solo on a held Db''' (musical example 21) and holds it for four beats. Such a display once again gives us an insight into the personality at work, a man who likes to show just how good he is.

Musical Example 21:



After this bold opening, Eldridge shows off his fast finger work, working his way up and down the staff smoothly. His next big leap comes in bar 10 when he rises up to an F''', chromatically moving up to the note from a D''' (musical example 22). Eldridge holds the F''' for just a quaver before moving down to a Bb'' and carrying on in the middle range of the instrument for the rest of this first solo. Throughout this solo, Eldridge makes use of many shakes and bends to great effect; this is another example of Armstrong's influence on Eldridge as they are used in a very similar fashion to Armstrong. Although Armstrong was not using these effects sparingly during the 30's, Eldridge does, using them in a very tasteful manner.

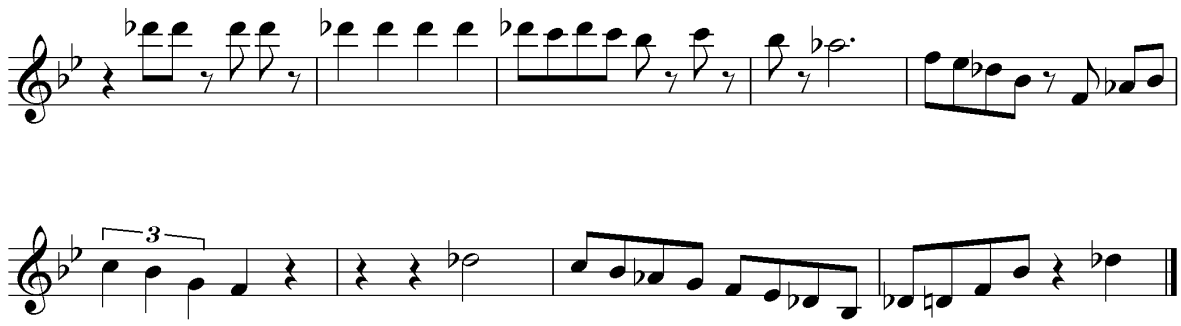
Musical Example 22:



The trombone takes an eight bar solo before Eldridge takes another solo for eight bars. I believe this is done to allow Eldridge a rest before his next solo. Perhaps his stamina is not up to taking a full thirty-two bar solo, or perhaps realising Eldridge's potential to "scream" in the upper register Henderson prefers him to take shorter high impact solo's more often. In any case, Eldridge's self-confidence is once again apparent upon his entry into his second solo which he plays nine consecutive Db''' (musical example 23). He then moves back and forth between C''' and Db''' before finally returning to the mid-range of the instrument and finishing off his solo.

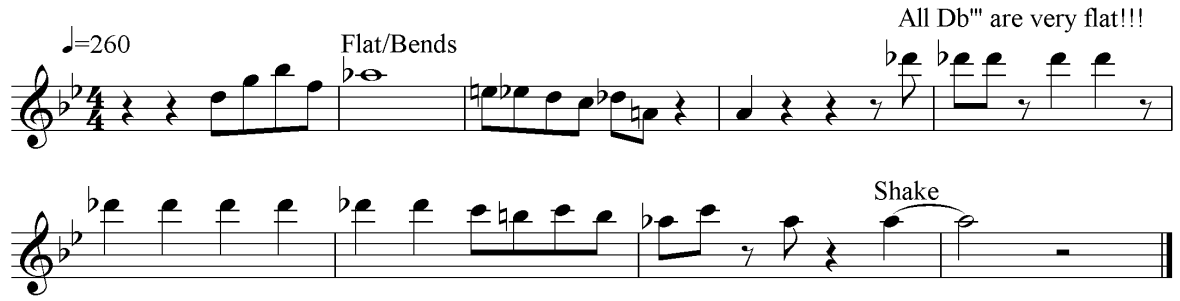
[138] CD: Track 19

Musical Example 23:



In the next month, Eldridge records *Jangled Nerves*[139] (09.04.36) with the Fletcher Henderson Orchestra, the piece is very fast paced at over 250 bpm. Eldridge takes a twenty-four bar solo, the structure of which is of particular interest. The first eight bars consist of some fast finger runs in the mid-range of the instrument; it is not until the middle eight bars that Eldridge really opens up and plays high. Half way through the middle eight bars of his solo he begins to play consecutive Db''', eleven in total, followed by a move back and forth between C''' and B'' (musical example 24). The Db''' hit by Eldridge are very flat in this solo, so much so that they could be mistaken for C'''. It would make more sense however for Eldridge to be attempting to play minor thirds given the context and his style.

Musical Example 24:



We have seen this feature of his playing before during *Christopher Colombus*[140] in which he used a similar motif of repeating a high note and then alternating between two notes slightly lower than the first. In his final eight bars, there are some fairly high notes but nothing in the same range as the middle eight bars. The insecurity of his playing on this solo can be forgiven considering the fast tempo of the piece (which fluctuates considerably throughout the recording) and the difficulty of which it is to generate ideas and execute them precisely at this pace.

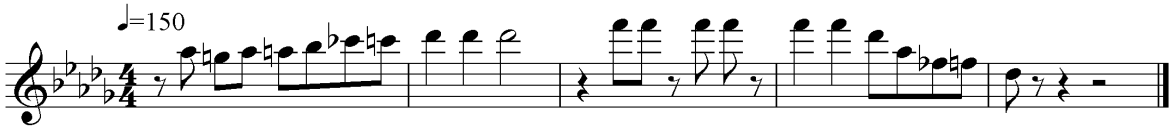
The 1940's

Following his time with Fletcher Henderson which Eldridge described as school, he led his own bands and played with other big bands. The next big chapter in his playing came in 1941 when he joined Gene Krupa's orchestra. Over the next eight years Eldridge would be the featured soloist for the band,

[139] CD: Track 21
[140] CD: Track 20

his sound developing a distinctive growl.[141] His high register playing through this period remains confident, hitting F'" consistently and moving up and down the register with speed and accuracy. To once again compare Eldridge to Armstrong, some of Eldridge's work with the Gene Krupa orchestra can be compared to Armstrong's crowd pleasing effects of the 1930's, an example of this would be *Let me off Uptown*[142] which is a duet with Anita O' Day. Eldridge's solo shows his power in the top register but it is clearly just a commercial effect. To begin his solo he chromatically rises to D'" (musical example 25), playing three in the short-short-long rhythm that Armstrong was so fond of using. In the next bar however he rises even higher hitting six F'" in a row before descending back down.

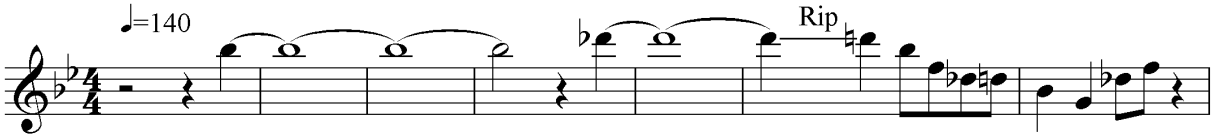
Musical Example 25:



After You've Gone[143] is an Eldridge feature, the band is there simply for him to work upon. He plays more or less constantly for the full two minutes of the piece, moving at pace all over the register displaying good stamina and some very fast fingers. The piece is full of effects from Eldridge, most notably his repeated chromatic rips from Bb" to F'" which come shortly after the clarinet solo. Also his super fast chromatic run from Bb' up to Gb'" during his trumpet break a few bars later.

Another example of Eldridge's control in the extreme register comes in his playing on *Kick It!*[144] where he makes use of another Armstrong trademark, the long held high note, shown in musical example 26. Eldridge holds the Bb" for eleven beats over a minor motif played in the band before taking a single beat rest and launching up to a Db'" for six beats, finishing it off with a rip up to a D'".

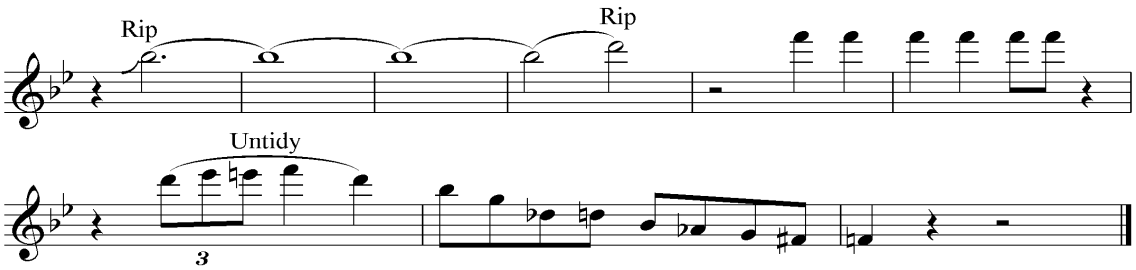
Musical Example 26:



When the minor motif returns in the band a second time Eldridge holds the Bb" for thirteen beats, finishing it off with a rip up to a D'". He plays six F'", all tongued and all rich in his vibrant tone.

[141] Barnhart, op cit., p.199
[142] CD: Track 22
[143] CD: Track 23
[144] CD: Track 24

Musical Example 27:



In the next bar, he imitates the lower trumpets chromatic phrase beginning on D" and rising to F''; Eldridge plays it the octave up. The effect is not convincing and untidy, perhaps after the long held high notes he is feeling the strain.

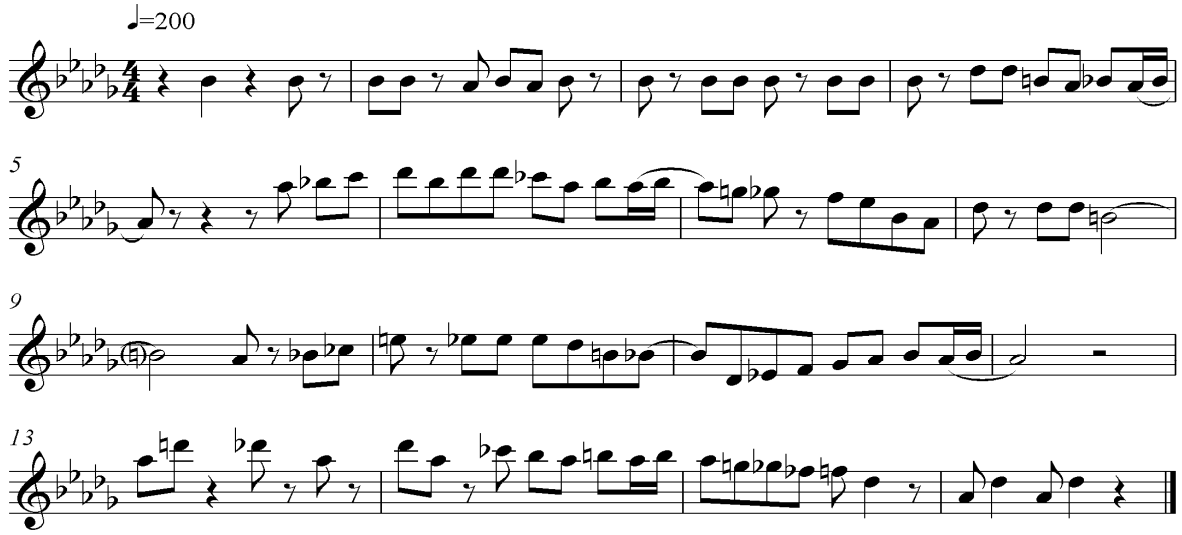
Eldridge's high playing followed on from the work done by Armstrong and Smith and showed that with such a skill in your bag, it can be used very effectively. Although a remarkable player in his own right, Eldridge is commonly only remembered for linking the styles of Armstrong and Gillespie. Eldridge would become Gillespie's idol, although not as competitive as Eldridge, Gillespie would adopt the "go for it" attitude in the upper register that Eldridge was so famous for.

Dizzy Gillespie (1917-1993)

John Birks Gillespie was one of the most pioneering trumpet players in jazz in terms of trumpet lineage as he, with Charlie Parker formulated the modern style of jazz called bebop.
Consistent high playing however never developed in bebop as it did in the swing bands of the 1930's and 1940's. Perhaps the fast paced tempo and intricacy made it too difficult to keep a solo sustained in the upper register, and for this reason there were no high note specialist players in bebop. High playing was instead used as a feature of a performer's style, one extra trick in the bag. Dizzy Gillespie, would often use the upper register in the course of a solo to add excitement.
As a young player, Gillespie idolized Roy Eldridge[145] and was heavily influenced by him. In 1937, he took over Eldridge's seat[146] in Teddy Hill's band, making his recording debut. It was not until Gillespie joined Cab Calloway's band in 1939 that his own style began to emerge. He kept some of the defining features of Eldridge's sound however-his fast paced runs, go-for-it attitude and his high register playing.

One of Gillespie's earliest solos on record is on *King Porter Stomp*[147] (1937), shown in musical example 28. Gillespie comments that this was his first recording date and that he was "playing it safe", not trying anything challenging.[148] Gillespie's highest note is a D'" which he hits at the beginning and end of his solo. We can infer, from both the sound of these notes and from his own testimony that to date this is not the top of his range as these high notes do not sound forced. Also, he tends to tongue his high notes giving them a lot of clarity showing that he must have had a good sense of pitch. Bars 13 and 14 show off his accuracy perfectly as he hits a number of short notes in the upper register, placing each precisely and accurately.

Musical Example 28:

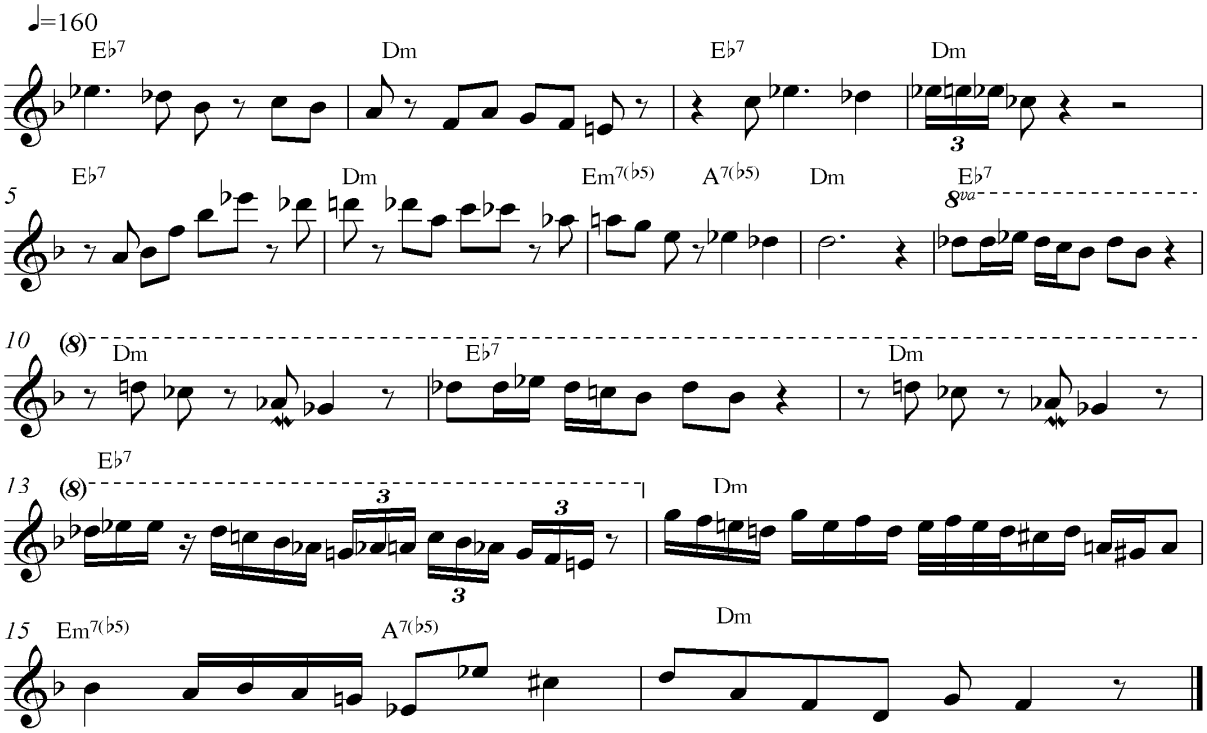


The length of this solo is sixteen bars; it is interesting that Gillespie chooses to play high in the last four bars of each eight bar chorus. Perhaps in a call and response fashion to bring each opening phrase

[145] D. Gillespie & A. Fraser: "To Be, or Not... to Bop" (Minneapolis, 2009), p.241
[146] Ibid, p.65
[147] CD: Track 25
[148] Ibid, p. 72

to an interesting conclusion, there is also the consideration of his lip and allowing himself rest between upward excursions. Gillespie's recurring use of the mordent, both upward and downward at the end of bars 4, 6, 11 and 14 are similar in fashion to those employed by Eldridge and Armstrong.
In 1945, Gillespie sat in on a recording session that Boyd Raeburn and his orchestra were cutting of his composition, *A Night in Tunisia*[149], his solo is shown in musical example 29. Although there were approximately eight years between this recording and *King Porter Stomp*, Gillespie's range has not improved much. His highest note is an Eb''' but once again we can see Gillespie's intelligent use of the upper register to add excitement to his improvisation.

Musical Example 29:



The Eb''' is used at the top of a phrase in which Gillespie outlines the chord notes of bar 5, his accuracy in terms of pitching and tonguing is still very good as the phrase is executed well. In bar 9 he plays a short phrase that although initially might look quite difficult to play, actually fits under the fingers very well when examined in the pitch of Bb. The phrase is high pitched, beginning on a concert Db''' and reaching up a tone before moving in step downwards to a Bb''. Bar 10 is the answer to this initial musical question of bar 9, Gillespie making use of an upward mordant for decoration. This two bar call and response motif is repeated over bars 11 and 12.

Gillespie's contribution to jazz in terms of improvisation is immeasurable. His high playing exploits are tasteful and make up an important part of his improvisational style. This is his legacy when speaking of high playing as he successfully blended his high playing so that it was not the only recognisable feature of his sound. Although he did play high and even said in his biography that in 1946 he was able to hit a Bb'''' [150], he would never consistently play in the upper register like others of

[149] CD: Track 26
[150] Ibid, p. 241

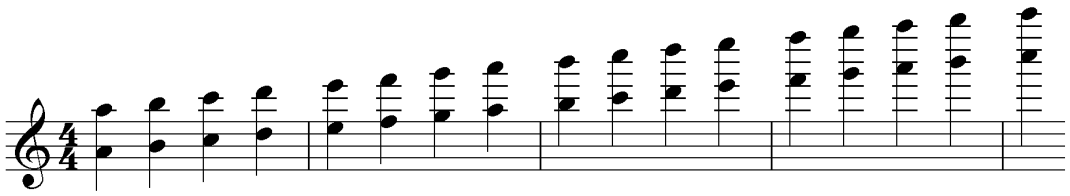
this period. Gillespie's improvisational style would inspire Jon Faddis and Arturo Sandoval who would master Gillespie's style and take it to a new level, including his high playing.

Cat Anderson 1916-1981

William Alonzo Anderson was a trumpet player who was one of the first to be considered as a high-note specialist. He was active during the late 1930's through to the 1970's when he became a regular studio musician. He gained recognition however from playing with the Duke Ellington orchestra for a number of periods, first joining in 1944. Anderson grew up in Jenkins Orphanage in Charleston as he lost his parents at the age of four; it was here that he learned to play the trumpet. Anderson's debut on record was with the Carolina Cotton Pickers, a small band based at the orphanage with whom he cut four sides. After leaving the orphanage in 1935 Anderson played with a number of big bands including Claude Hopkins' big band, Doc Wheeler's Sunset Orchestra, the Erskine Hawkins Orchestra, Sabby Lewis's Orchestra and the Lionel Hampton Big Band[151]. Ellington asked Anderson to join his orchestra in September 1944. Anderson would leave Ellington twice to pursue other projects including solo work and fronting his own band but would always return to Ellington, playing during 1944-1947, 1950-1959 and 1961-1971. Anderson died of a brain tumour in 1981.

Anderson was the first true "screamer", a term used to describe the sound of the trumpet when it is played in a register above normal. Generally, a C'"(Bb pitch) is what most players will strive to play with ease, perhaps also reaching a few tones above this. Until the last century, very little music written for trumpet would rise above a C'". When discussing the high playing of Armstrong, Eldridge and Gillespie we have examined examples of them playing up to a fourth, fifth and sixth above C'" (Bb pitch); but these efforts are nothing when we consider Anderson. In an interview he was asked "how high is high? Right now it's three C's above the staff. But as time goes on I'm sure the bounds will be broken".[152] Here is how this would look as music:

Musical Example 30:



The names that have been associated with such notes are called "doubles" and "triples" in America. They are referred to as "supers" in Europe. "Doubles" begin an octave above A" until a "triple" is reached an octave above the "double" [153]. Anderson's opinion on high playing illustrates the fact that this kind of playing is always in flux, it is always evolving as players become more and more proficient the bar is raised. Such a massive range however is the result of years of hard work, study and consistency.

The Method:

Anderson wrote a method book which was published in 1973 containing exercises and pieces designed to increase the upper register, endurance and confidence. A revised copy was published recently by a student of Anderson's, Geoff Winstead. The revised edition contains full explanations,

[151] Winstead: "Cat Anderson Bio" *The Real Way to Play the Cat Anderson Method*
[152] C.G Conn Company: "Nobody Can Play Higher" (1975)
[153] C. Anderson & G. Winstead: "The Real Way to Play" (2009), p.9

lesson plans and some interesting stories about the legendary trumpet player. This valuable insight allows us to pick apart Anderson's technique and can help us understand what went into his practice regime to give him such a tremendous range.

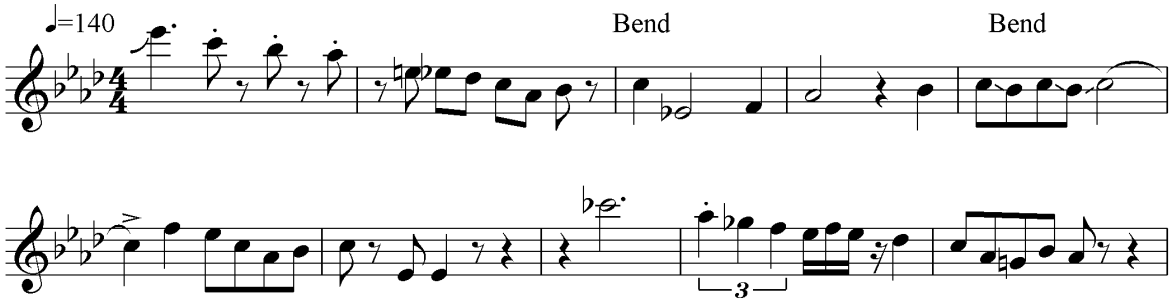
Warming up is one of the most important aspects of brass playing. Anderson's method calls for a soft G' to played for twenty minutes, breathing through the nose when required to allow the mouthpiece to remain in the same position on the lips. Being able to play the soft G' is very difficult in itself as the note must be so quiet that it is barely audible within the airstream passing through the instrument. Winstead explains that the only way to play the note in the correct way is to use as little mouthpiece pressure as possible showing the player just how little pressure is needed to play a note.[154] Daily repetition of this and similar exercises are intended to get the player to use less mouthpiece pressure, therefore causing the musculature around the lips to strengthen.
Anderson's method also calls for an unusual embouchure set up in which the front teeth are touching lightly together.[155] The book mentions that this altered set up will augment a players normal embouchure to a more "even set position".[156] This means that the mouthpiece can be set on a completely flat surface and the pressure will be distributed evenly over the two lips. The method makes no mention as to whether Anderson played normally with his teeth touching but his endurance most likely comes from practicing with this embouchure set up. We can also infer from the lack of mouthpiece pressure required to play the soft G' that Anderson used a very small amount, or could play higher than normal without having to resort to it. Finally, both these factors together with the long exposure of metal and lips for twenty minutes done daily will soon build endurance. This warm-up exercise and others like it are done before starting any section of the method, illustrating the importance of consistency.
One principle that runs throughout Anderson's method is that of rest. After every exercise the player is told to rest for a period of up to twenty minutes to allow the muscles to rest and re-build. This principle is similar to weight lifting. As the muscles are put through exhaustive stimulation they then require rest so they can rebuild bigger so a higher note can be obtained.
Another theme running through the method is how important playing softly is. In the original foreword to his method of 1973 Anderson comments that; "when you warm up softly, you preserve yourself for whatever playing is to come. By warming up softly, you give the blood in your body a chance to circulate at a normal pace".[157] Whether or not such a comment is based in fact is uncertain but clearly Anderson felt that warming up in such a way helped him to be at his best when on the bandstand. Playing softly requires less effort from the lips and more control over the air stream so incorporating this into daily practice most likely helped Anderson control his top register.
As with most exercises in the book, contact must be kept at all times between lips and mouthpiece so that the lips get used to extended exposure.

Anderson, born 5 years later than Roy Eldridge belongs to the same generation, both players making their recording debuts in the mid 1930's. As Anderson's career developed he began to appear on more records mainly showing off his high register. One such record is from 1941 with Doc Wheeler's Sunset Orchestra called *How 'Bout that Mess?*[158] By this early stage, Anderson has clearly not yet found his own sound as his solo is in a similar style to Louis Armstrong with its bent flattened thirds, long held high notes and shakes. We do get a glimpse into Anderson's technical ability however,

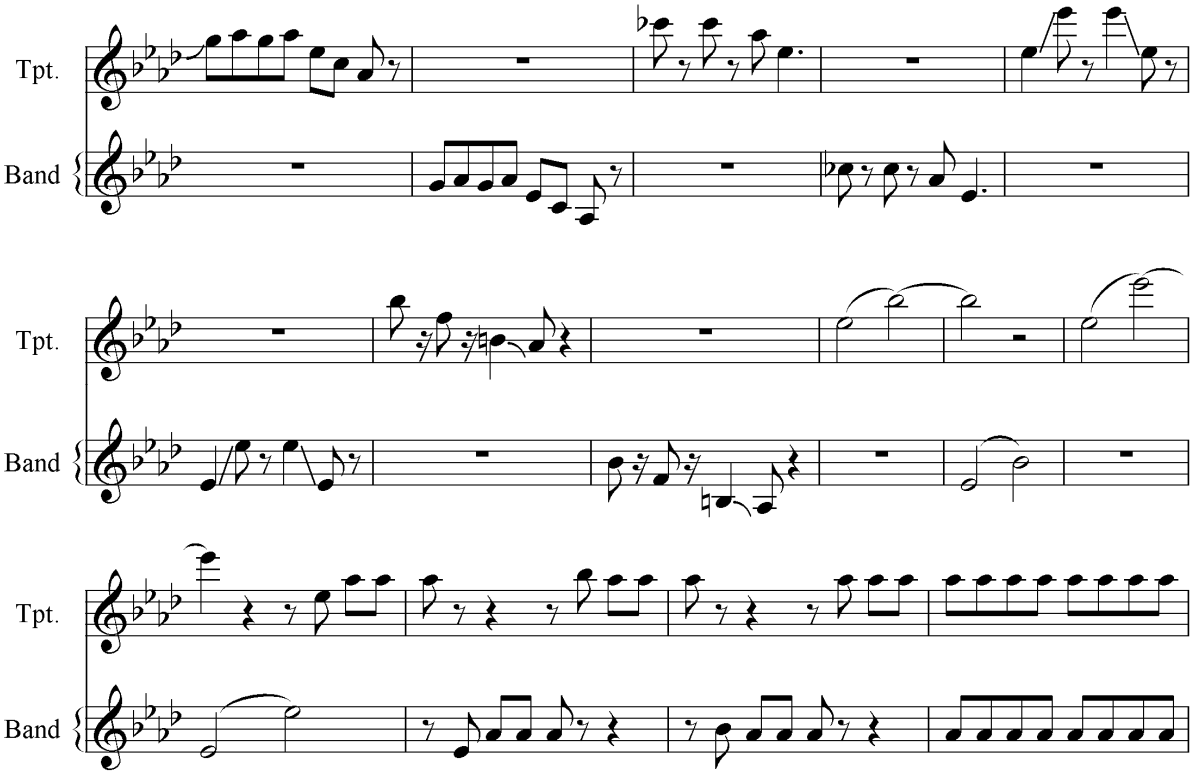
[154] Ibid, p.13
[155] Ibid, p.11
[156] Ibid p.12
[157] C. Anderson: "The Cat Anderson Method-A Systematic Approach to Playing High Notes" (1973), p.3
[158] CD: Track 27

accurately hitting every single high note with brilliant confidence. The solo is in two parts, the first is a trumpet solo in the normal sense (musical example 31) and the second part is a call and response imitation between Anderson and the rest of the orchestra (musical example 32).

Musical Example 31:



Musical Example 32:

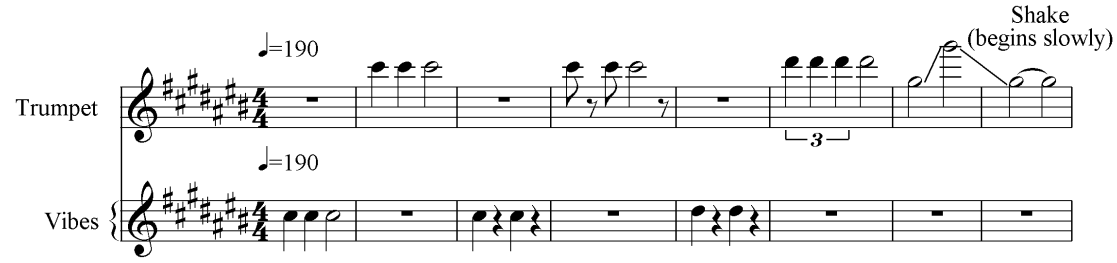


Anderson's high playing is reserved, with his highest note being an Eb'". Every one of his high notes however is precise, in tune and comfortable which signals that his range could be considerably higher. He rips up to the Eb'" boldly to begin his improvisation. He also makes use of the Eb'" during the call and response section, beginning on an Eb" and ripping up to the octave above. He then rearticulates the Eb'" before falling back down to the octave below. A very important display of his control throughout the register. He also uses the note once more when slurring from an Eb" to the octave above near the end of his solo. It is interesting to observe the clear Armstrong influences in this solo as it helps to show just how influential Armstrong still was throughout this period, every trumpet player had a few Armstrong licks in their "bag". The first example being the held Cb'" of bar 8 which

begins on the second beat and carries through the bar, identical to the Armstrong trademark long held high note feature. Anderson's descent in the next bar also sounds very similar to the Armstrong style in terms of phrasing and ornamentation.

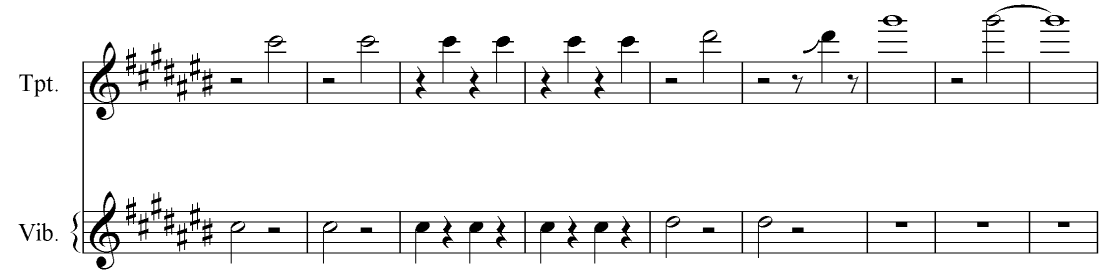
In the next year of 1942, Anderson began playing with Lionel Hampton and his orchestra. Possibly the most famous record to come out of the orchestra from this year is *Flying Home*[159]. There have been many recordings of this classic piece but the version from 1942 includes a call and response section between Anderson and Hampton (musical example 33). In a similar fashion to *How 'Bout that Mess*, the call and response is imitative with Hampton calling and Anderson responding. The difference being that on this record, Anderson is unrestrained and reaches some very high notes indeed. Beginning to imitate the vibraphone on a C#'", Anderson moves up to an F#'" before glissanding an entire octave from G#" to G#'" in bar 7. Anderson then flawlessly falls back down to the G# the octave below and begins a slow, superbly controlled shake getting faster and faster which could be likened to the "terminal vibrato" of Armstrong's playing.

Musical Example 33:



Following an eight bar band break, the call and response between trumpet and vibes re-enters (musical example 34). This time, each instrument halves how long they play. Throughout this, Anderson hits C#'" before rounding off the section by using a D#'" to leapfrog up to a G#'".

Musical Example 34:



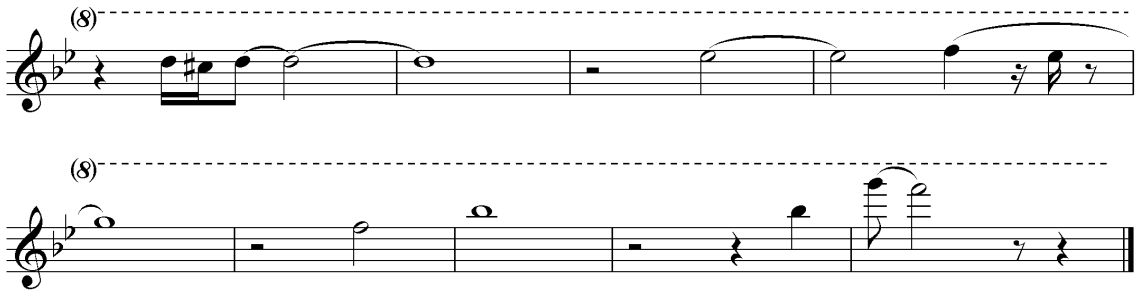
The final G#'" is not quite as full in sound as some of his other notes on the record but this can be forgiven as it comes at the end of this barrage of high notes and is slightly hidden with the re-entry of the band.

Anderson joined the Ellington orchestra in 1944, his distinctive sound quickly became a central part of the orchestra. As we have seen prior to 1944, other bandleaders were already making use of Anderson's facility in the upper register. It was Ellington's arrangements however that utilised this

[159] CD: Track 28

facility to its full extent, giving Anderson many features and opportunities to tastefully use his wide range. On many of Ellington's recordings Anderson can be heard soaring high above the band, also using the plunger and half-valve techniques to great effect.
One of Anderson's earliest features is an arrangement of *Blue Skies* by Irving Berlin called *Trumpet No End*[160], arranged for Ellington by Mary Lou Williams [161], cut in 1946. Trumpet solos span the entirety of the track; some of Anderson's highest playing however comes during the last twelve bars of the piece (musical example 35). During this final climax, Anderson can heard in full force playing high above the band, using a multitude of long high notes to help build the intensity toward the end of the piece. He gets higher and higher until he reaches the tonic of Bb two bars before the end of the piece, playing the Bb two octaves above the staff.

Musical Example 35:



For the final chord, Anderson plays the Bb''' again using it to leap up to a G'''' very briefly before settling a tone below, on the fifth of the chord, an F''''. At this point, he clearly runs out of breath or his lip goes as the note is not held for long and dies away almost as soon as it is played.
Examples of Anderson's use of high playing within the band itself are also evident in this piece. The band plays a number of stabs, one at 1:34 in which a trumpet can be heard on the top of the texture, the note hit is a Bb'''. Also, two stabs are played at 1:38, a trumpet is clearly audible playing an F''''. This sort of screaming on the trumpet would have been a very new sound to the listener as no other trumpet player had perfected such high playing at this time. The scream trumpet had appeared in big bands since the early 1930's but no one had reached the heights of Anderson.

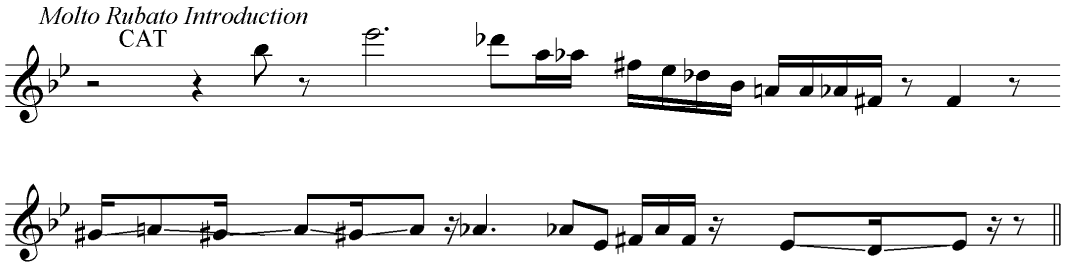
El Gato:

The appropriately name *El Gato*, meaning "The Cat" is another Cat Anderson feature. I have examined the 1959 recording of the track from a live concert in Germany[162], as well as another live recording of the track from Duke Ellington's 70th birthday concert in 1969[163]. Using these two recordings of the same piece from two different periods of Anderson's life, we can attempt to see if there is any difference in his playing. The major difference between the two recordings of the piece is that the 1959 version is a trumpet section feature, with each trumpet player taking a turn to solo. The 1969 version however is purely Anderson for the duration of the piece. It is possible therefore to examine his different approaches to high playing. The piece begins with an introductory cadenza in free time split up over four chords held by the orchestra. In the 1959 version, Anderson takes the first

[160] CD: Track 29
[161] D. Ellington: "Music is my Mistress" (1976), p. 169
[162] CD: Track 30
[163] CD: Track 31

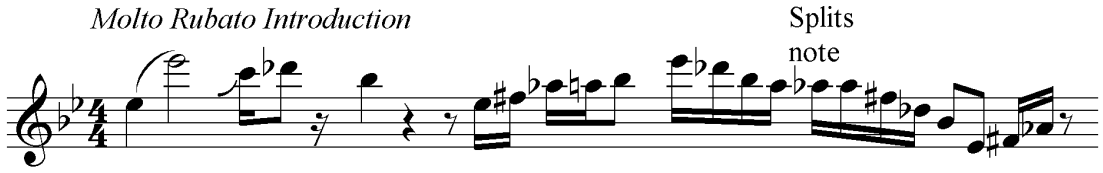
chord (musical example 36), using a Bb" to leap up to an Eb'" before cascading back down in a very bluesy fashion, incorporating lots of lip bending effects.

Musical Example 36:



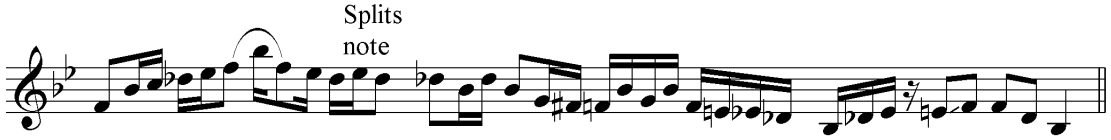
The other trumpeters in the section take the next three spots of the cadenza. None of them go nearly as high as Anderson reaches. In the 1969 version, Anderson takes the whole introduction, using not only high notes but lots of half-valve and lip bending techniques to give a very characterful introduction. In this recording, he begins with an octave leap from Eb" to Eb'" (musical example 37) with no other harmonics hit on the way up. Before the next intended note of Db'", a C'" is played. Although this note could be intentional, and would sound fine in this context, the manner of which it is played implies that Anderson has mis-pitched the Db'" and a C'" speaks just before the Db'".

Musical Example 37:



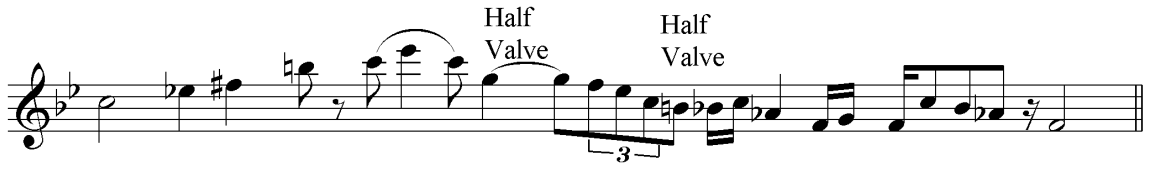
In the following bluesy semiquavers run, similar in style to the 1959 version, Anderson reaches once again up to an Eb'". This shows that whether it be a long held note, or within a fast fingered phrase his high notes are clear and controlled, even if he does split the repeated Ab" on his cascade back down the register. Over the next chord (musical example 38), Anderson moves in a sequential manner, with an F" to Bb" to F" slur showing his control once again.

Musical Example 38:



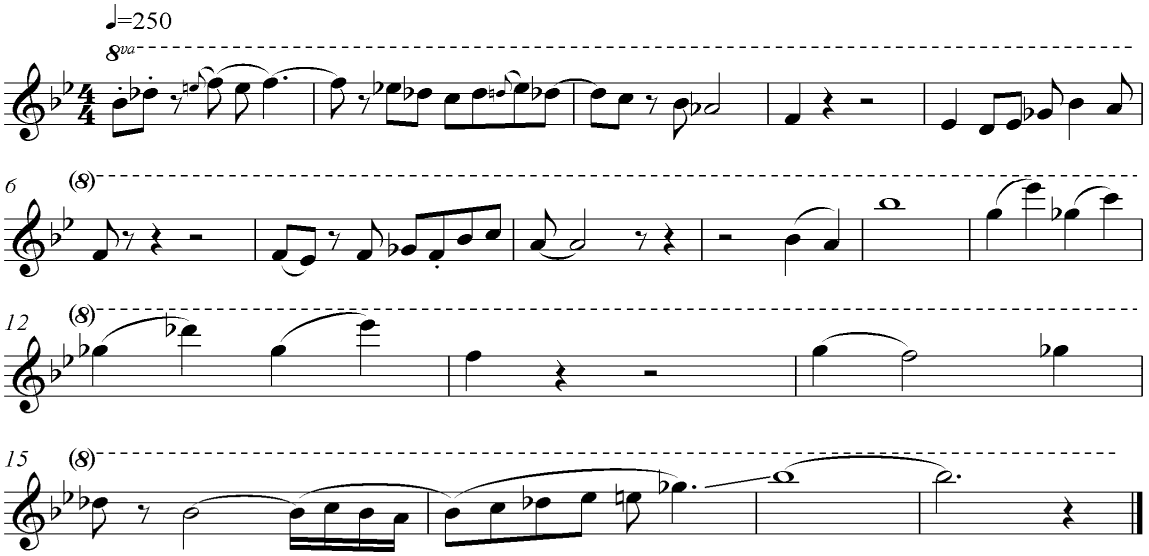
He mirrors this idea over the next chord (musical example 39), this time slurring back and forth between a C'" and an Eb'" before moving back down to the mid-range of the instrument.

Musical Example 39:



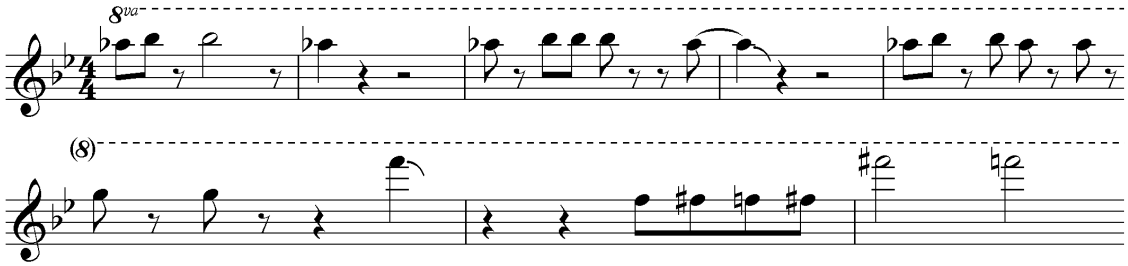
In his final improvisation of the introduction he shows off his mastery of the half-valve technique, creating some almost comical effects before finishing with another blues ridden phrase. This introduction, although containing a handful of high notes relies more on the other extended techniques in Anderson's bag, namely the vocal effects of his lip bending and half-valve techniques.
Following the head played by Anderson comes the solo section. In the 1959 version each individual of the trumpet section trade solos, with Anderson taking two. His solos are very intense, vibrant and high. His distinctive sound is unmistakable as it powers over the band, roaring through the last bar of Ray Nance's plunger solo to climax on an F''' (musical example 40). Once again, Anderson's control in the upper register is clearly apparent in this solo. In the eleventh and twelfth bar he slurs a number of intervals in sequence, he does not mis-pitch any of them and no unwanted notes creep in. He rounds off the solo with a run from a Bb'' to a Gb''', and the final flourish is a slide up to a Bb'''.

Musical Example 40:



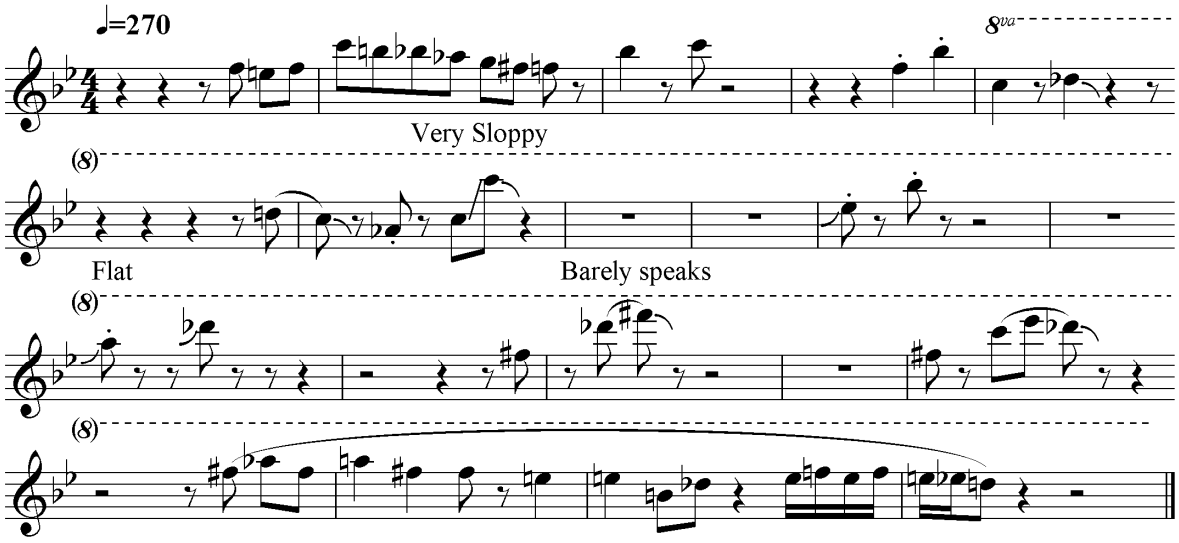
Eight bars later, after another Ray Nance solo, Anderson enters again this time repeating a riff (musical example 41), then varying the riff before the final climax of the section, hitting a F#'''' and resolving onto a F''''. The drum break then enters, giving the soloists a rest.

Musical Example 41:



The 1969 version features an extended Anderson solo. As the solo is some one hundred and twenty eight bars Anderson clearly does not go for it in the same fashion that he does when the solo is split up. Anderson does not play high notes from the outset therefore, but builds it up using his fast and controlled fingers in the middle register. It is not until late in the solo that he does begin to move into the upper register (musical example 42) slowly building toward the end. Unfortunately, his tiring lip is audible as Anderson's normal confidence, fluency and control in the upper register are replaced by short squeaking noises as he attempts to force his way up. So much is the case that some of the notes are in fact barely audible.

Musical Example 42:

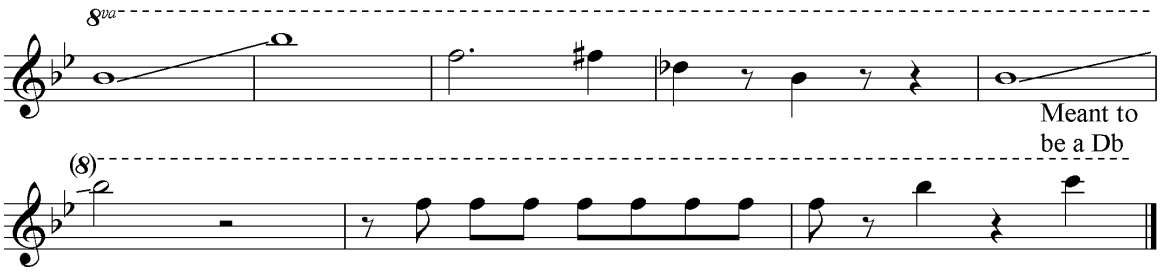


Also Anderson's normal ability to tongue his high notes with disciplined precision is lost and he favours the easier rip up to the notes. When he finally does manage to play a longish phrase in the upper register it is sloppy in accuracy and sound. He does not tongue individual notes but instead keeps the air stream going, again opting for the easier option of slurring all the notes. His perseverance does pay off however as he rounds off the solo with a convincing Bb'".

Following the solo is the drum break, after which comes the "super trumpet" section in which the trumpet section play a fast and complex melody in unison. Similar to the "super saxophone" concept

used by many big bands. In the 1969 version, Anderson's lip has clearly recovered from his solo having had time to rest during the drum break. The unison section is somewhat sloppier than the 1959 but still has the desired effect.
Following the unison trumpet section, Anderson takes another solo in the 1959 version. Using it as another opportunity to show off his incredible range and control (musical example 43). He plays two, two bar long octave slides from Bb" to Bb"', rounding off the eight bars with an attempt to hit a Db"" but mis-pitching it and playing a C"".

Musical Example 43:

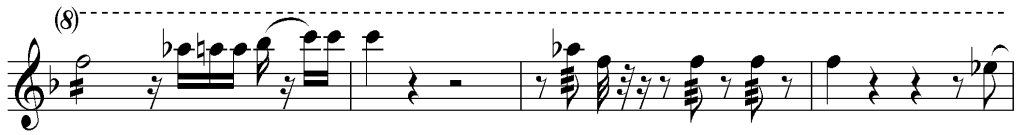


This solo is taken by the drummer in the 1969 version; perhaps Anderson is aware that although his stamina is very good, he cannot maintain it having played such a long solo earlier in the piece.
The final build up just prior to the end of the piece once again sees Anderson in the top register helping to bring the piece to a climatic finish. In the 1959 version he once again plays repeated Bb"' as the final chord is repeated over and over, putting in the odd octave slide. Anderson attempts a similar thing in the 1969 version but without the slides. His final chord high notes are noticeably flat however, again emphasising his tired lip by this stage of the piece.
From these two versions of the same piece, it is clear that high playing cannot be sustained in the long term, regular breaks are needed in order to sustain it. As we see in the 1959 version Anderson's regular breaks allow him to really make the most of his solos. The version from 1969 shows us that even if one is playing in the lower and middle range, attempting to then move upward without a break makes it so much harder.

One further example of Anderson struggling to play high for long periods is during *Blue Pepper (Far East of the Blues)*[164] from the album *Far East Suite* of 1966. During the final forty bars of the piece Anderson plays a solo over the top of the orchestra, never touching the staff. The solo differs from his other improvisations as this one's intent is to act as a response to the main melody being played by the band, filling in gaps and generally adding another texture to the music. Although tasteful in the sense that Anderson does not constantly play over the band allowing gaps for the melody to come through, he does resort to effects rather than interesting phrases to colour the solo. One such recurring effect is the false fingering tremolo effect (musical example 44), a technique that allows a tremolo to be played by playing the same note on different harmonic series.

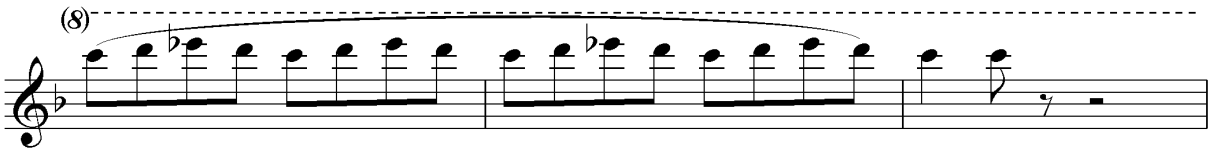
[164] CD: Track 32

Musical Example 44:



Anderson uses this technique extensively in the last six bars, possibly due to fatigue as by this point we can hear that he is having difficulty sustaining a note. Also, for his final note he attempts to leap an octave to play an Eb"" but the note does not sound, adding further evidence to support his previously mentioned fatigue. Speaking generally of this solo, it is less controlled than we have come to expect from Anderson's technique, especially as he allows himself a fair amount of breaks between phrases. Some of his longer held notes are thin sounding as in bar 31, also some of his shakes are out of tune and lack control as in bars 5 and 9. The best phrase of the solo comes in bar 27 (musical example 45) where Anderson rocks back and forth between Bb"' and Db"" for two full bars, his sound is full and the notes are perfectly in tune giving us a glimpse of that tremendous technique.

Musical Example 45:



Far East Suite is a very interesting album in terms of high playing, Ellington makes the best use of Anderson's unique ability to add colour and flavour to certain parts of his arrangements. Screaming is only heard a handful of times.

In the generation before Anderson, Louis Armstrong had reached to the top of his register to finish off a piece, often hitting the final note in the higher register to bring the piece to a climactic finish. A generation later this device evolved so that the entire final chorus would be played in the upper register. This is Anderson's contribution to high note jazz playing as we have seen at the end of *Trumpet No End*[165] (1946), Lionel Hampton's *Flying Home*[166] (1942), *El Gato*[167] and *Blue Pepper*[168] (1966).

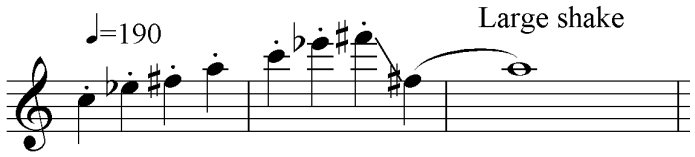
[165] CD: Track 29
[166] CD: Track 28
[167] CD: Tracks 30 & 31
[168] CD: Track 32

Maynard Ferguson 1928-2006

Maynard Ferguson is possibly one of the most pioneering trumpet players of the twentieth century. Having begun in jazz just as the genre was declining and the big band was becoming less and less financially viable he would cross over into film music, rock, fusion, funk, disco, and musical education to bring his music to the masses.

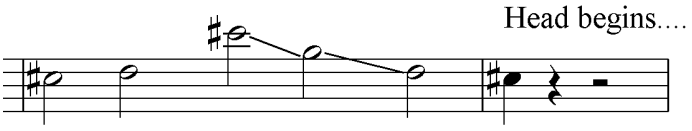
Upon moving to America in 1948, one of Ferguson's earliest recordings is a feature with the Charlie Barnet band, *All the Things you are*[169] (1949). This piece not only displays his acrobatics in the upper register but also shows off his expressive side with a number of slower melodic sections. The piece begins with the brass section playing a rising figure in unison (musical example 46). Ferguson enters on a raspy F#"', sliding down an octave and rising slightly to an A" shaking the note vigorously.

Musical Example 46:



The rest of this opening is quite melodic in style expect for the leap of just under an octave from D" to C#"' and the following successive slides downwards to G" and then to D" before Ferguson dives into the melody of the head (musical example 47).

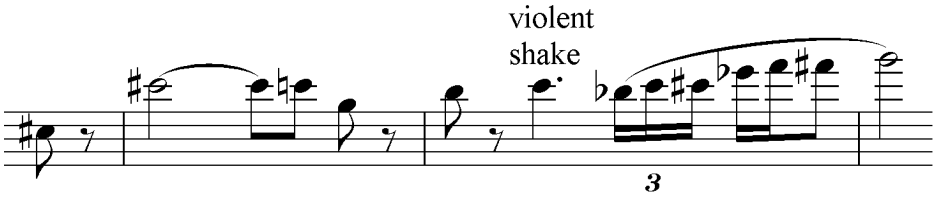
Musical Example 47:



This first statement of the head is very melodic and we can hear Ferguson's vibrato-ridden sound in the middle register over the band. His sound when playing in this melodic style is very operatic; made so by his use of vibrato and giving a sense of straining or longing on the higher notes. His early classical training is indeed fresh in his mind, shining through in his sound. Following the statement of the head, the band launches into double time. Various rising figures in the trumpets featuring long violent shakes on the high notes give an immediate sense of the intensity and excitement in preparation for Ferguson's solo. His solo enters on the fifth bar of the new tempo and immediately the serious, sentimental sound of the head is gone, replaced by a different Ferguson whose sound is raucous and raspy as he sails around the extreme register of the trumpet. Beginning with an octave leap from C#" to C#"' his sound is suddenly different; the operatic vibrato remains but is quicker and not as obvious, also certain notes are shaken violently to exaggerate them (musical example 48), much like Armstrong was doing some twenty years prior to this, now taken to the extreme.

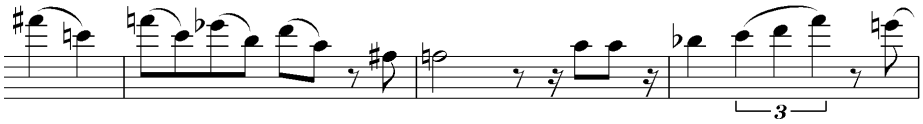
[169] CD: Track 33

Musical Example 48:



Ferguson plays some very fast phrases during this section; unfortunately many of the notes are not audible as he moves around so fast, slurring almost much every note. There is little in the way of definition generally as Ferguson tends not to re-tongue notes in the upper register, but instead either slurs between them, or uses what sounds like an air push to articulate. There is a drastic difference between his slower playing and faster playing in the upper register, his faster ideas as discussed sound untamed and a bit on edge where-as his slower higher playing sound is full of energy as in bars 3 to 6 of this solo (musical example 49).

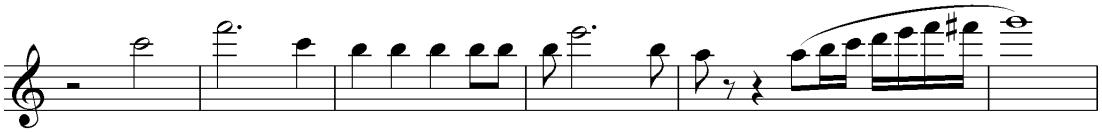
Musical Example 49:



Ferguson's highest note is a C"" which he rises to chromatically from a Bb''' in the fifteenth bar of his solo. These high notes sound like they are on the edge of his range as they are quiet and do not possess his brassy tone. Instead the notes sound strained, similar to the vocal inflections of speech, further adding a human element to his sound. To finish off his first solo, Ferguson chromatically rises to a B''' and holds it for a bar and a half. The note is noticeably thinner in sound than some of his other slightly lower notes and the tuning is slightly off, perhaps illustrating that this is close to his highest note.

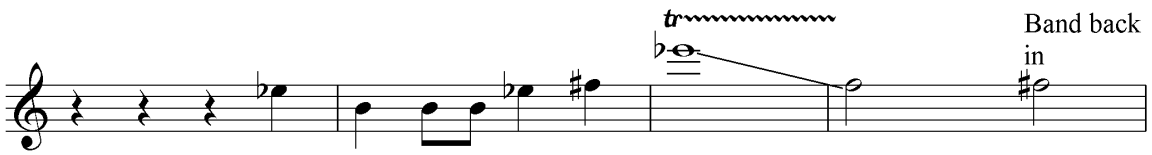
Ferguson states the head again, this time confidently in the upper register soaring above the band. His sound is full, clear and full of life. The head is rounded off with a run up to a G''' shown in musical example 50:

Musical Example 50:



The band then drop out briefly and the piece slows back down to half time allowing for Ferguson's melodic sound to come back once again and gently build over some long held chords in the band. The climax at the end of this section sees Ferguson rise up to an Eb''' and trill with the note above (musical example 51). Finally he slides down to an F" and resolves onto the F#" at which point the band re-enter in double time for the final section.

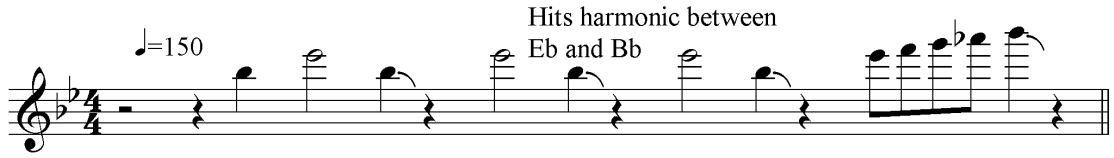
Musical Example 51:



Ferguson quoted one of his many influences as Louis Armstrong[170] and this dramatic long held trill is a clear example of this, similar in fashion to the final dramatic cadence of some of his pieces. The final push to the end of this piece features Ferguson once again playing in the upper register, building his solo upward to a fast paced conclusion. His final octave leap from Eb" to Eb'" rounds off the piece as the band play the final chord, Ferguson settling on a Bb".

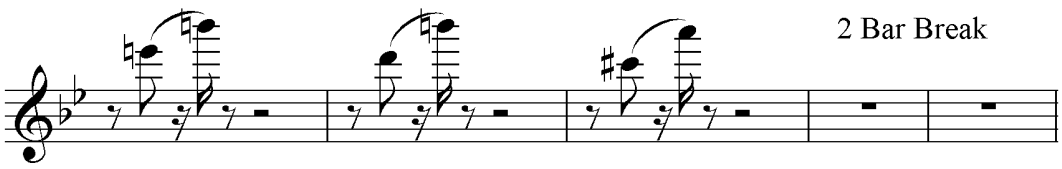
Between 1950 and 1953, Ferguson joined Stan Kenton and his Innovations orchestra. Shorty Rogers was arranging for the band during the early 1950's and wrote a feature for Ferguson simply called *Maynard Ferguson*[171]. As with *All the Things You Are*, the piece plays to Fergusons' strong points; his ability to scream and his melodic operatic style. It also features some fast bebop style playing in the mid-range of the instrument which shows us that Ferguson was so much more than just a screamer. The piece opens with a cadenza (musical example 52); Ferguson plays a repeated figure, leaping between Bb" and Eb'", he plays this three times before ascending up the Eb major scale from root'" to fifth"".

Musical Example 52:



When the band enters properly, it is at a slow tempo allowing Ferguson to use his mid range melodic style. After eight bars however the band launches into double-time and Ferguson unleashes his fast fingers. His fast paced bebop playing shows us that when not soaring into the upper register he could play very clearly and fluidly in the middle register of instrument. Just prior to Ferguson's high note solo, he enters with some interval slurring in the upper register before a two bar break, shown in musical example 53:

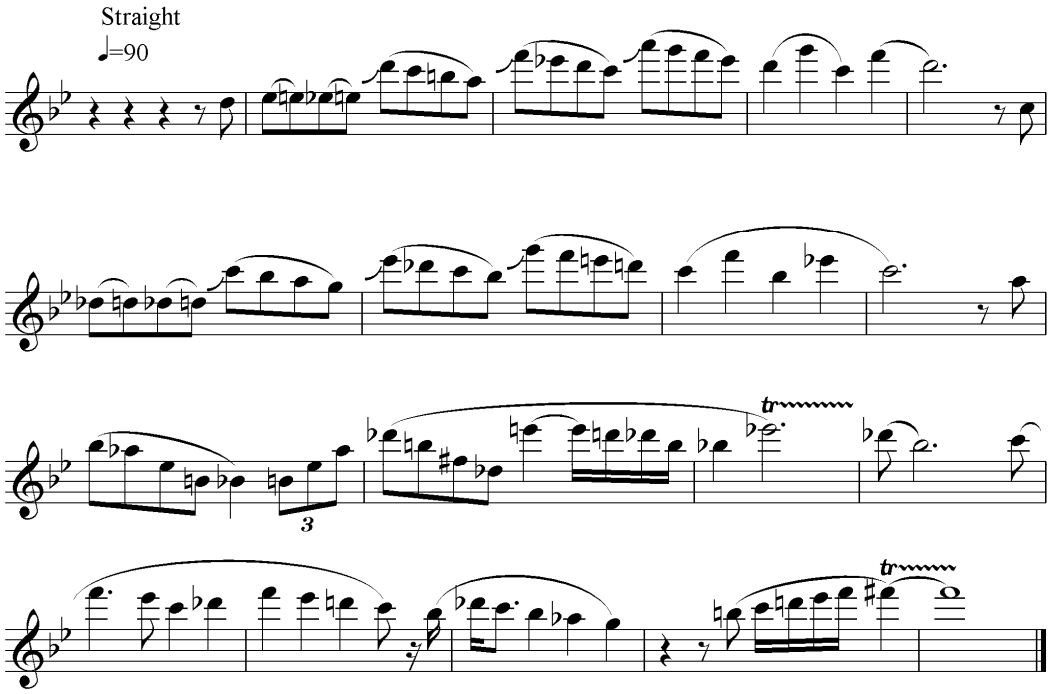
Musical Example 53:



[170] M. LaBlanc: "Maynard Ferguson, Trumpet Player, Bandleader" (Detroit, 1992)
[171] CD: Tracks 34 & 35

During this two bar break, Ferguson unleashes a fast run up and down the register of the instrument. It is unclear as to whether this run is actually controlled or not, although the shape of the phrase remains, the notes are indistinguishable. The effect is a raspy cackle from the instrument which helps Ferguson launch into his high register solo. This solo is similar in style to "All the Things You Are" in that it is high in pitch and intensity. Ferguson's pace is fast, the elevation of the notes unfortunately detracts from the solo itself as certain phrases are not as clear as they might be if the same solo were an octave lower. Excitement and virtuosity carry the solo more than anything else.
The next half time section allows Ferguson to show off his melodic high playing (musical example 54) with what could only be a written solo featuring lots of large interval leaps and a couple of trills.

Musical Example 54:



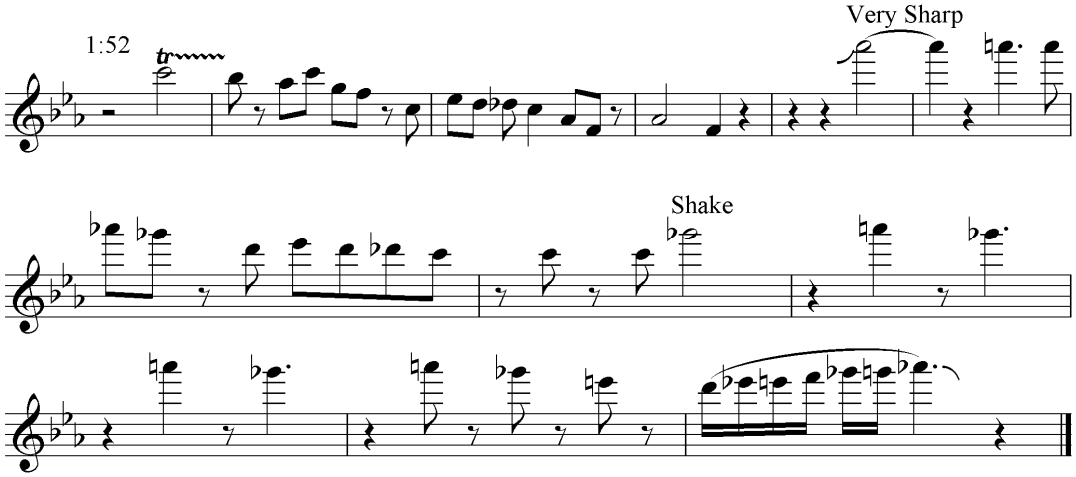
The power of Ferguson's sound is the most breathtaking feature of this kind of playing. Although these notes are relatively high and the tempo is quite slow, he still manages to fill the instrument with a lot of air creating a huge sound. Once again the use of slurs and the lack of tonguing reveal how Ferguson can sustain such a sound for eighteen bars. Ferguson does not break up the air stream by tonguing individual notes; instead slurs can last many bars as he empties his lungs in a long controlled exhalation. The only change is the speed at which the air stream is moving. When he does go to breath, the mouthpiece remains in the same place on the lips and he inhales through the corners of his mouth, all he need do is reposition his lips on the mouthpiece and start the process again. The lip trill is used twice during this solo to great effect. It differs from a normal trill in that it does not use valves and instead moves back and forth by slurring between two harmonics. This kind of trill was used extensively during the Baroque period on the natural trumpet.
Following this half time section, the band kicks into double time to bring the piece to a close. Ferguson can be heard doing some screaming toward the end of this ten bar section preparing for the final call and response ending between himself and the band where he attempts to go as high as he can. He begins by slurring octaves from Bb" to Bb'". The tuning on each one of the three repetitions of this octave slur is bad however; perhaps an indication of fatigue. He then slurs upwards from a C'",

most likely attempting to hit the octave above but in fact just managing to hit the E above this C; E"". For the final few chords Ferguson repeats Eb"', moving up to a sharp G"' for the penultimate chord and hitting a very sharp C"" for the final chord.
Having examined three different recordings of this piece it is clear that Ferguson was very consistent. His playing on all three versions is pretty much identical, from his high notes to his raspy effects during breaks. This points to a piece that is intended to shock the audience and show off Ferguson's capabilities to the full; it is clear therefore why he took first place in Down Beat magazine readers best trumpeter poll between 1950 and 1953.[172] Critics however regarded his high playing as "commercial", used to draw crowds in[173] and with a piece like *Maynard Ferguson* it is obvious to see why such accusations were made. In an interview Ferguson admitted his "biggest speciality" was high notes but asks why a bandleader would not play to the strengths of his band.[174] I have previously touched on how Louis Armstrong was accused of using similar displays to draw crowds in during the 1930's but by the 1950's there were many more people playing high. It seems strange therefore that the technique was *still* regarded in such a negative light especially as we have seen examples of Ferguson using his ability in interesting ways.

In 1956, Ferguson would lead his own big band; the Birdland Dreamband. The band's most defining feature was its tight brass section. Having played with the Stan Kenton and Charlie Barnet, it is logical to think that Ferguson was influenced by them and wanted a similar brass section sound described as a "wall of sound".[175] What must be taken into consideration is that whilst with the Barnet and Kenton bands, Ferguson was not playing lead trumpet but was sitting on the lower end of the section in fourth and fifth seats. Ray Wetzel was the lead trumpet player with Barnet in 1949 and then with Kenton in 1951 and according to a testimony from Ferguson it was Wetzel who would rehearse the section rigorously if he didn't like the way the parts were played at a gig.[176]
One of Kenton's idols was Jimmy Lunceford.[177] Kenton was attracted to this sound by the precision of the band, who were rehearsed endlessly; he also liked the high trumpet sound of Paul Webster who was Lunceford's high note specialist between 1935 and 1944. The reason that Ferguson would eventually be hired by Kenton was that he "wanted the trumpets to be in the stratosphere" [178], perhaps attempting to emulate Lunceford's sound.
A track from 1937 entitled *For Dancers Only*[179] sheds some light onto the sort of high pitched trumpet sound Kenton admired so much. At 1:20 into the track after the mid-range head is played, the trumpets enter in unison with a high pitched scream from Gb"' to E"'. Tone quality and execution are perfectly together. The trumpets also have a unison rising figure at 1:44 just prior to Paul Webster's trumpet solo. As before the notes are perfectly together despite the slightly awkward rhythm and elevation of the notes. Webster's solo is quite high pitched for this period and retains a lot of musical interest as shown in musical example 55. It is clear however that he is right on the edge of his range here as his highest notes sounds particularly weak and the tuning is off throughout the solo.

[172] "The Downbeat Readers Poll Archive" *Downbeat*
[173] P. Richard: "Playing the Way I Feel" (1951)
[174] Ibid
[175] M. Sparke: "Stan Kenton: This is an Orchestra!" (Denton, 2010), p.290
[176] C. Burnap: "A Conversation with Maynard Ferguson" (Radio 2, 1995)
[177] Sparke, op cit., p.11
[178] Ibid, p. 49
[179] CD: Track 36

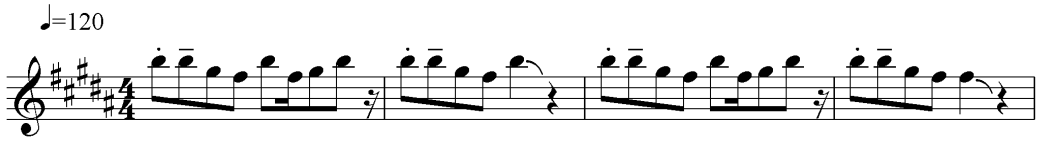
Musical Example 55:



The shake does feature in this solo twice to great effect; I only mention this as I have discussed how important the shake was in Ferguson's playing. Webster's shake is much less violent than Ferguson's and sounds like an imitation of Armstrong's.

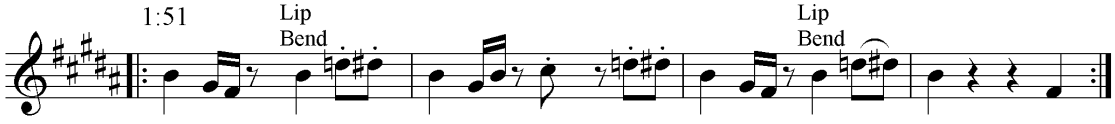
Another example of the high pitched trumpet ensemble work that Kenton had in mind comes from *Lunceford Special*[180] from 1939. From early on in the piece, the trumpets are in the upper register playing in unison a short four bar phrase (musical example 56). The polished sound is clearly evident as the falls of the second and fourth bar are done at the same rate and end exactly together.

Musical Example 56:



A similar polished sound comes at 1:51 (musical example 57) when the trumpets play another four bar phrase in unison. Each articulation is flawless, and a lip bend over the course of a crotchet can be heard by the entire section on the third beat of the first and third bar. The speed of the tune makes this particular trick very impressive.

Musical Example 57:



The trumpets then return to the upper register for four bars in unison unmistakably creating a "wall of sound" effect. The final section of this piece features Paul Webster playing in the upper register doing a call and response style feature to finish. Here we have a further example of the typical 1930's high playing feature to finish off the piece adding texture and excitement for the finale.

[180] CD: Track 37

Whether or not Maynard Ferguson was influenced directly by Paul Webster is unclear but it is important to realise that Kenton was very much influenced by the Lunceford sound that featured Webster so heavily. Indirectly therefore we can link Ferguson to Webster through Kenton as Kenton strived to create a large and precise sound through lots of high trumpets, something that Ferguson himself would do with the Birdland Dreamband.

Although many people believe that Ferguson had "super chops" or played on a special mouthpiece, Ferguson attested his wide range to his breathing technique. Ferguson moved to India in 1967 and became fascinated by Indian culture, especially the philosophies and breathing techniques surrounding yoga. Ferguson studied the book, *The Science of Breath* by Yogi Ramacharaka which delves into metaphysics, spirituality and state of mind. The book also contains chapters on the correct method to breathe which was of particular interest to Ferguson who would later say in 1972 that he doesn't "breathe like everybody else".[181] The Science of Breath's deep breathing method is called the "Complete Breath" in which a single inhalation can be broken into three parts. This three step method should be done in one continuous movement:[182]

1. Lower part of the lungs.
   (Diaphragm moves down, abdominal walls move forward)
2. Middle part of the lungs.
   (Pushing out lower ribs and breast bone)
3. Higher part of the lungs.
   (Chest is lifted; abdomen will be slightly drawn in)

The exhalation should be done slowly, holding the chest firmly in position allowing the abdominal muscles to squeeze the air out of the lungs.[183] Deep breathing in this way can help one relax and energised as utilizing the entirety of the lungs allows more oxygen to be taken in.[184] If we look past the spirituality associated with the breathing methods however there are some interesting concepts that could be used to relieve performance anxiety. From a Down Beat article of 1972, Berliner briefly describes Ferguson doing his breathing exercises as part of his warm up routine, "Maynard moving into his strange Hatha Yoga breathing exercises, stretching, leaning, his entire body seeming to fill with air".[185] If Ferguson used the deep breathing method when playing the trumpet as he attests, it would allow him to support his large upper register sound. The only issue that does not add up however is that the yoga breathing method speaks of inhaling slowly, which most of the time is not plausible when playing a passage of music. Perhaps Ferguson had become so adept at this method that it had become as natural to him as normal breathing for most people. After all, he did say that he doesn't breathe like most people.

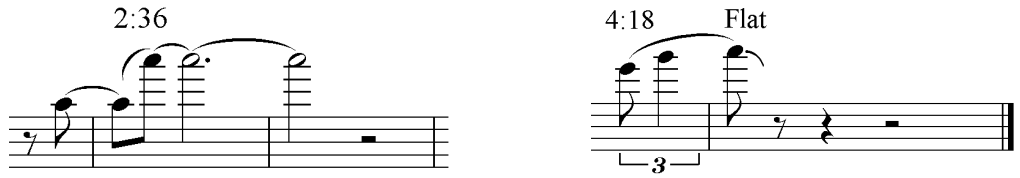
During the 1960's and 1970's in an attempt to keep a fresh sound, some jazz musicians crossed over into the more popular genre of rock, the most notable example being Miles Davis. Likeminded younger individuals such as Maynard Ferguson did the same, replacing the big band with a smaller line up containing electronic instruments. From 1976, Ferguson began working on a series of studio

[181] E. Berliner: "M.F.'s Back in Town" (1972)
[182] Yogi Ramacharaka: "The Hindu-Yogi Science of Breath" (1903), Chapter 7
[183] Ibid
[184] Ibid
[185] Berliner, op cit

albums. Rich in complexity he would use countless session musicians to create a sound distinctly his own drawing heavily from the popular music of the day, giving it a big band jazz flavour. The first of these was the album *Primal Scream*, followed by *Conquistador*.

The album *Conquistador* from 1977 is particularly important in Ferguson's career and I believe in the history of high playing as it is from this album that *Gonna Fly Now*[186] is taken. The piece was a cover of the official movie soundtrack version for the film "Rocky" reaching 28 in the Billboard chart on April 23rd 1977; staying in the chart for thirteen weeks[187], and earning Ferguson a Grammy nomination.[188] Ferguson's high playing on this album is quite different from his early days in the Stan Kenton band focusing on his melodic high sound rather than showing off his fast style. This album is very tightly arranged and *Gonna Fly Now*; Maynard's hit single from this album is no exception, it is clear that a lot of thought has been put into when Maynard soars in the upper register and when he does not. In this way energy and excitement are kept throughout the piece. Although certain elements of the piece come across as a little too polished due to the excessive production of the album, we can still hear a glimmer of humanity in Ferguson's playing. During a number of slurred octave leaps for example Ferguson can be heard landing slightly too sharp and readjusting down to the note (musical example 58). Also Ferguson can be heard running out of breath toward the end of his long held E''' of six bars. Finally, his last note is also noticeably flat.

Musical Example 58:



It is interesting to note what a recording studio of the 1970's was capable of doing; multi-tracking was widely used by this point and musicians did not have to play together to record together, so parts could be overdubbed at any time. Consistent high note playing is a difficult feat, so the option of dubbing his parts must have been useful to Ferguson.
Such a polished recording utilizing Ferguson's high melodic playing sounds far removed from the sound of Cat Anderson where he can be heard giving his all to get the notes out. Ferguson's playing however almost has a romantic quality to it with its effortlessness and smooth sound that appears to keep going up. Another example of this kind of playing is the *Theme from Star Trek*[189] taken from the *Conquistador* album which again utilizes Ferguson's melodic playing in the upper register to great effect. One feature Maynard has kept since his early big band jazz days is the shake. Even during his work in the 1970's he still uses it, generally to round off phrases or long notes.
To many jazz purists, what Ferguson and others were doing during this period was not seen as jazz. Ferguson's fusion sound however was on the more accessible side of jazz fusion, probably because he featured a number of covers. Through this and constant touring Ferguson established himself as a household name in America and Europe.

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[186] CD: Track 38
[187] "Gonna Fly Now-Maynard Ferguson" *BillBoard Chart*
[188] Z. Stewart: "Maynard's Changes" (1985)
[189] CD: Track 39

In 1988, Ferguson returned to his jazz roots with his new band, Big Bop Nouveau which focused on more traditional big band arrangements. He toured with this band successfully, being inducted into the Down Beat Jazz Hall of Fame in 1992. He was playing with this band right up until his death in 2006 from an abdominal infection.

In terms of high playing, we have already examined in detail the exploits of Cat Anderson who was doing a similar thing to Ferguson a decade earlier. Ferguson differs however in that he managed to establish himself as a personality and through this was able to reach a much wider audience; making his high playing and a tight brass section the main attraction of his show. Ferguson's hit single of 1977 meant that his music reached a much wider audience; people who would have never listened to jazz suddenly were exposed to his sound. Also, arrangements of popular tunes in the Ferguson style such as the *Theme from Star Trek*, *Macarthur Park*[190] and *Hey Jude*[191] meant that Ferguson's sound was easily accessible by non-jazz fans and immediately recognizable. The screaming trumpet sound would therefore become synonymous with Maynard Ferguson to many people, despite the technique being used extensively by others in jazz prior to his arrival on the scene in 1948. His education programme of performing in schools also meant that his popularity would be that much wider as the younger generations would be exposed to his music. Despite Ferguson getting older and older, there would always be young faces in his audience, captivated by his dazzling technique and showmanship. In this way, Ferguson brought high playing from the back row of the big band to the front of the bandstand and eventually into the limelight. Along the way he would inspire the next generation of trumpet players to emulate his style and high playing wizardry as they grew up listening and transcribing his solos. The major difference between Ferguson and the high players before him is the fluidity of his sound which truly soars. His upper register playing appears limitless as he plays long, and slow melodies in the upper register with lots of vibrato and a piercing tone.

[190] CD: Track 40
[191] CD: Track 41

Conclusion: How has high playing evolved in jazz?

High trumpet playing has been practised since the Baroque period but went out of fashion due to its difficulty. The invention of the valve meant that trumpet virtuosity was no longer centred around the elevation of notes but instead with the speed and flexibility that one could play. High playing became subordinate to other virtuoso displays until it finally re-emerged though jazz to be widely used and practised once again.

High playing within jazz began with Louis Armstrong; his use of high notes during his improvisations of the 1920's paved the way for a new generation of players to attempt similar displays. Early use of high playing within the big band therefore was normally a solo feature for the lead trumpet player. Outside of the improvisational setting, the lead player would also add high notes to the block chords played by the section. As more players were becoming comfortable in the upper register, charts began to move with the trend and by the end of the 1930's the screaming trumpet sound was an integral part of the big band. The reason for the popularity of high register improvisation, as we have seen with Armstrong's work of the 1930's, was that it was an effective means to draw audiences in. It is logical therefore that other big bands would employ a high note player to perform similar displays to Armstrong to also draw crowds in. For this reason, some of the high note solos featured in big band music of the 1930's do not fit over what is being played underneath by the band, illustrating the fact that crowd pleasing was more important than appropriateness. Other such examples from the early 1940's give further evidence as we see on *Flying Home* and *How 'Bout That Mess* where Cat Anderson's call and response role although simple is in good taste. The impression is given however that arrangers of the time were still trying to find a formula that would work for the screaming trumpet solo. The "high note specialist" would become increasingly important as time went on as he would take the responsibility of the high notes from the lead player but would not generally improvise, although perhaps being featured. Cat Anderson would become Ellington's high note specialist in 1944. Anderson's arrival on record in the mid-1930's marks a change as he was able to play up to notes unheard of before, causing the generally accepted range of the trumpet to move upward. Anderson's contribution was to build on Armstrong's exploits, playing the entire final chorus up an octave. He would also add his extremely high notes to the stabs and chords played by the section. During the trumpet feature *Trumpet No End* of 1946 the band plays relentlessly, keeping the intensity high throughout the piece. There is never a point where the soloist alone is carrying the piece. The final chorus also features Anderson playing his super high notes to bring the piece to a big finish. *Trumpet No End* illustrates that high note trumpet playing works well over a high intensity backing. Further evidence to support this comes from Maynard Ferguson's playing on *All the things you are* and *Maynard Ferguson* where the hectic accompaniment of his upper register solos have a tremendously invigorating feel as if the band is on the edge of falling apart.

By the 1950's the high note feature was common, bandleaders still wanting, and to a certain extent needing to show off such a skill to get audiences in. Maynard Ferguson's arrival in New York in 1948 was the next big landmark in terms of high playing. Although during this period he was doing a similar thing to Anderson, he would become more significant later as he was able to market his sound to a wider, and more importantly, younger audience. Ferguson's lasting contribution was his style of playing and dedication to the high register which formed the keystone of his act.

The suitability of Maynard Ferguson's high note displays are no different to Armstrong of the 1930's, taken to a new level of virtuosity. Ferguson would come to centre his act around high playing touring high schools and colleges, inspiring younger generations to pick up a trumpet and see how high they could play. As discussed, the effort required to play in the upper register gives the trumpet a straining quality that can lift a phrase or help a solo build, Ferguson's constant use of the register seems to be questionable therefore. How can a technique that is best used as a device to add excitement be constantly used; surely this would get rid of its entire purpose in the first place? More likely is that the difficulty involved in reaching such high notes is the true appeal of this type of playing and why audiences have flocked to see performers do it since Armstrong in the 1930's. There is a fine line between musical interest and vulgar displays of virtuosity, the latter however is what most brass players tend to gravitate toward as they strive to emulate their heroes. Playing high notes on the trumpet is more popular now than it has ever been with many books and devices available to improve the upper register. Special mouthpiece have been developed that aid in attaining the upper register, also advancements in technology have seen improvements to the trumpet for the same purpose. As the link between physiology, technique and range is understood, the market for helping students to improve these areas has expanded. Devices like the "Personal Embouchure Training Exerciser" have been specifically designed to help build the muscles of the embouchure away from the instrument to improve power, endurance and range. Books dedicated to developing the high register are common-place, each with tantalising tips and secrets to widen range[192]. Many cover the same basic approach however showing that there is no secret, just lots of consistent practice. The development of the midi trumpet, which offers a number of octaves more than an acoustic trumpet shows where the future of brass playing may lie, however, as there is no need to form the embouchure to play it. With this instrument the possibilities are truly endless as high notes can be achieved with ease, problems associated with endurance are gone and one can just pick it up and play.

From my analysis of upper register improvisation, certain trends are apparent showing that there is a formula to this kind of playing that many of the great trumpet players stick to.
The solo cannot be too long as it is very difficult to play in the high register for a long period of time with consistency and musical interest. In the high solos of Roy Eldridge and Cat Anderson we see them at their best when given sufficient time to rest. Even with later players like James Morrison we see a trend toward short excursions into the upper register, or beginning low and building the solo

[192] **Maggio:** Following a lip injury and the loss of some of his front teeth, Louis Maggio thought his career was over, until he developed his own system for playing that would revolutionise how many players approach the instrument. Maggio developed a very specific embouchure set up where the lips are pushed into a forward position and the instrument itself is pointed downward. The method stresses the importance of using syllables to create the correct air stream for different registers. The Maggio system preaches consistency, and is set out so that the student will slowly increase their range by playing from the very bottom of the instruments range to the very top every day, retaining the pedal note embouchure in the high register.

Caruso: Carmine Caruso's "Musical calisthenics for brass" follows the teaching practices and views of the great teacher. The method consists of lip building and breath control exercises deigned to condition the body into playing correctly, whilst also building musculature and increasing stamina. Once again, consistency and patience is paramount.

Gordon: Claude Gordon's "Systematic Approach to Daily Practice" consists of a strict routine of exercises taken from other highly regarded trumpet texts. The method is broken into 52 lessons covering every aspect of brass playing, one of Gordon's key concepts is to rest as long as you play.

upward so that the only screaming happens toward the end as the solo climaxes. This is true of Dizzy Gillespie as well whose flights into the upper register are brief and sprinkled intelligently within his solo. Maynard Ferguson is the exception to this general rule as he did play in the upper register for extended periods throughout his career and showed that it could be done.
Certain methods of playing are also favoured over others because they allow easier playing in the upper register. A lack of articulation and a tendency toward slurring long phrases can be seen in the playing of Maynard Ferguson and sometimes Cat Anderson. Also, the rip effect is resorted to by many as accurately tonguing high notes can be unreliable.
Trademark phrases are also frequently used, the most common one being Armstrong's long held high note which would be used later by Eldridge and others in imitation. Despite having stolen it from Armstrong, Eldridge's repeated high note is a reoccurring theme in his improvisations. The shake, first used by Armstrong would be copied by every trumpeter who played jazz. This Armstrong trademark would be used later by Ferguson specifically in the upper register, instead of shaking however, he would lip trill, taking the shake to a new level.

When used sparingly, high playing can be a very useful technique as we have seen in the playing of Dizzy Gillespie and Cat Anderson. High playing trumpeters in jazz today therefore appear to be split. I have noticed two types of players, those who derive from the Maynard Ferguson style of long melodic high playing and those who have come out of the Dizzy Gillespie style of explosive, fast playing. Bud Brisbois, Bill Chase, John Madrid and more recently Paul Cacia have emerged from the back row of the big band as lead players to form their own solo careers. Following in the steps of

Ferguson, they too show off their mastery of the instrument by showcasing their extreme register playing. On the other side however are those players like Jon Faddis, Arturo Sandoval and James Morrison whose careers are based primarily on improvisation. Their exploits in the upper register are contained within their improvisation and are much more unpredictable as these players will use it to create energy and excitement simply by having the technique as another "trick" in the bag.

High playing has evolved as the latest generation of trumpet player has grown up listening to the exploits of the masters who have left their legacy on record. Most, if not all the top jazz musicians today are conservatory educated, meaning that jazz is not the only style that they perform. James Morrison, Wynton Marsalis and Arturo Sandoval for example are all accomplished classical musicians, illustrating that a large cross over now exists between the genres in terms of technique. As high playing was popularised by the likes of Maynard Ferguson and Cat Anderson, the next generation of trumpet player would strive to equal their hero's and eventually in rare cases surpass them as we have seen happen through the entire history of jazz. We have reached a stage however where precision, accuracy and particularly range are of paramount importance to a trumpet player. These prerequisites are now considered the norm as trumpet players forever reach upwards, imitating the masters who preceded them.

Appendix

Influential Lead Trumpet Players

The lead trumpet player became more and more important in big bands as the swing era went on. The lead player has the duty of establishing how a chart should be interpreted and phrased[193]; he/she occupies the top texture of the band and must be comfortable in all registers. Unfortunately, the names of many influential lead players have fallen into obscurity and are rarely discussed. The following are just a small number of those deserving honourable mention.

The man who shaped the lead trumpet sound of the swing era is considered to be Conrad Gozzo (1922-1964). Gozzo was a virtuoso with an astonishing range and tone quality who began learning as a child. From an early age he was winning contests and went on to play with Woody Herman, Benny Goodman and Claude Thornhill, as well as playing on film soundtracks. He released one album under his own name called "Goz the Great" in 1955, unfortunately alcoholism and gambling shortened his life drastically and he died in 1964. The International Trumpet Guild called Gozzo one of the seminal lead trumpet players of the twentieth century, many later lead players cite Gozzo as an influence.

Another influential lead player of the swing era was Eugene "Snooky" Young (1919-2011) who began his career as lead trumpet player with the Jimmie Lunceford band when he was just twenty. He can be heard on the records of; Count Basie, Lionel Hampton, Benny Carter, Gerald Wilson, Benny Goodman and Charlie Barnet[194]. His longest engagement being with "The Tonight Show Band" which he played in between 1967 and 1992.
Al Porcino (1925-) is also another notable lead player who described himself in an interview as "more or less the Maynard Ferguson of the day" [195]. He began playing at the age of 17 in the Louis Prima band[196] and would go on to play with the bands of; Stan Kenton, Woody Herman, Gene Krupa, Charlie Barnet and Count Basie having built a reputation as a high note player [197]. Porcino, like Young and Gozzo played with many bands and many other great trumpet players including a young Maynard Ferguson.

Porcino cites another great lead player as one of his early influences; Al Killian (1916-1950). Killian played lead trumpet with both Count Basie and Duke Ellington during his career, taking Cat Anderson's spot as high note specialist after he left. Not just a lead player, Killian was also a very good improviser and became very interested in the bebop movement of the 1940's.

Another high note specialist, lead player and soloist was Bud Brisbois (1937-1978). Brisbois was a primarily self-taught trumpeter who began learning at 12 and developed an extraordinary range early on. He was heavily influenced by Maynard Ferguson; playing along with Stan Kenton records as a teenager [198]. Shortly after leaving collage, Brisbois joined the Kenton band, first as the specialist high

[193] P. Keepnews: "Snooky Young, a Big Band Trumpeter, is Dead at 92", New York Times. 2011. p. B19
[194] D. Ramsey: "Snooky Young, 1919-2011". *Arts Journal*
[195] L. Tomkins: "Al Porcino". *Jazz Professional*
[196] Ibid
[197] Ibid
[198] "Bud Brisbois". *Seeleymusic*

note player but soon developing into a split-lead arrangement. Brisbois would go onto become a regular studio musician, as well as giving master-classes and clinics. Due to his proficiency in the upper register, Brisbois was pigeonholed early on as a high note specialist and would consistently turn up to gigs only to scream all night. Suffering from depression, Brisbois would take his own life in 1978.

The role of the lead trumpet player was crucial in the development of the big band. From early on they showed that the extreme high register was attainable and could be consistently used outside of an improvisational setting to add an extra texture to the band.

Group one: muscles which insert into the modiolus. The modiolus is located at the corner of each side of the mouth and is a thick fibre which a number of muscles attach to.

Group two: muscles which insert into the upper part of the orbicularis oris muscle.

Group three: muscles which insert into the lower part of the orbicularis oris muscle.

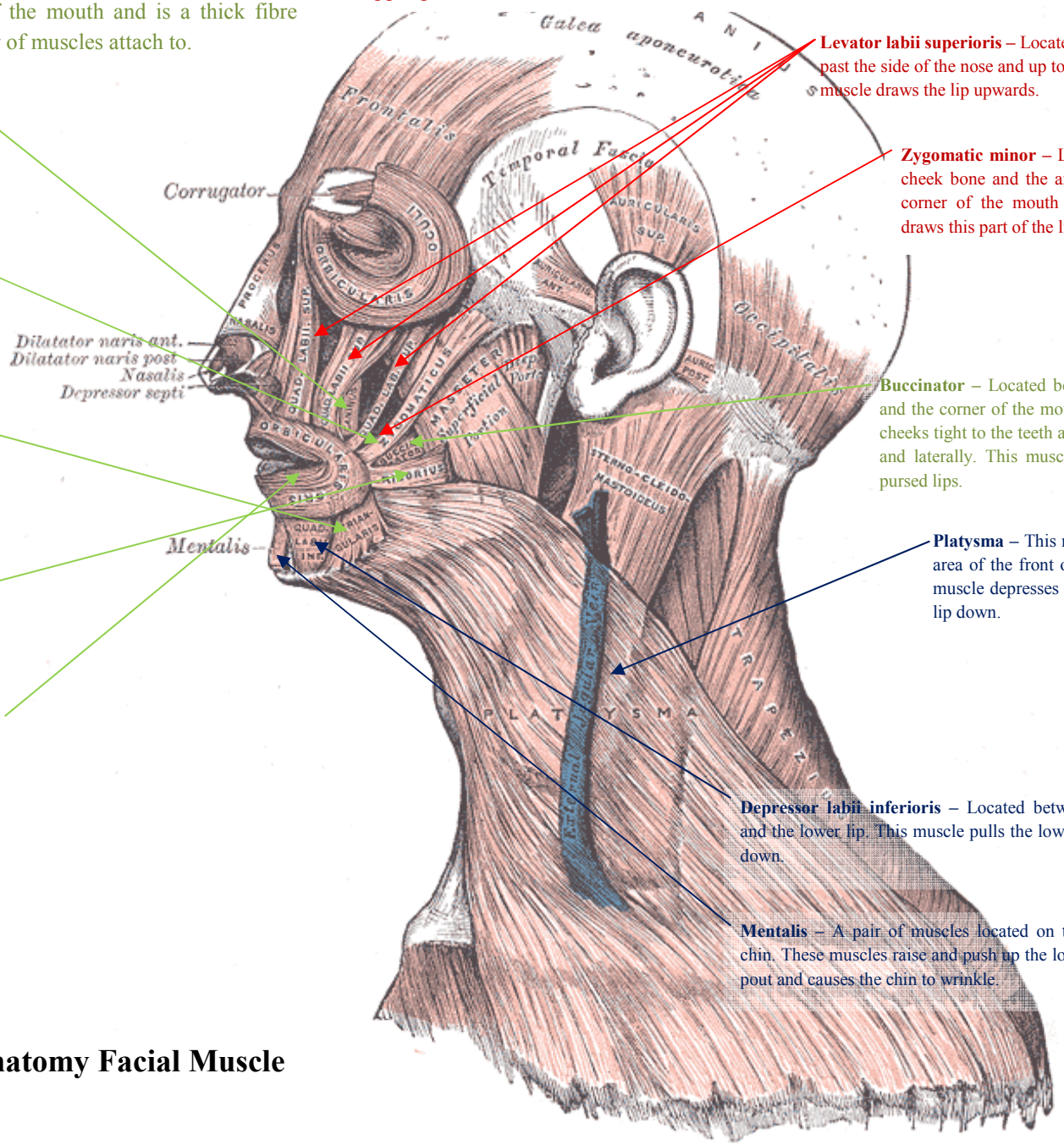
Levator anguli oris – Located between the upper jaw bone near the canine teeth and the corner of the mouth. This muscle pulls the lip up almost vertically.

Zygomatic major – Located between the cheek bone and the corner of the mouth. This muscle draws the lips upward and laterally into a smiling shape. A side effect of this action is the appearance of "crow's feet" to appear around the eye as the orbicularis oculi muscles are also involved with smiling, aiding in lifting the lips.

Depressor anguli oris (Triangularis) – Located between the cheek bone and the corner of the mouth. This muscle pulls the lips down into a characteristic unhappy expression where the lips form an inverted U shape.

Risorius – Located between the cheek bone and the corner of the mouth. As with Zygomatic major, this muscle pulls the mouth into a smiling expression. Risorius however is isolated and does not utilize the muscles around the eyes.

Orbicularis oris – This is the sphincter muscle around the mouth, it controls the size of the mouth opening and allows us to form our lips into a pucker shape. In everyday life it is responsible for the movements of the mouth during speech. This muscle has several strands that allow it to be formed into many versatile shapes. Four distinct movements can be created; a pressing together, a tightening and thinning, a rolling inwards between the teeth, and a thrusting outwards. This versatile muscle is *the* most important muscle utilized in playing a brass instrument.



Levator labii superioris – Located between the upper lip, past the side of the nose and up towards the eye. This muscle draws the lip upwards.

Zygomatic minor – Located between the left side of the cheek bone and the area of the lip midway between the corner of the mouth and the nasal wing. This muscle draws this part of the lip upwards.

Buccinator – Located between the back of the jawbone and the corner of the mouth. This muscle compresses the cheeks tight to the teeth and draws the lip corners inwards and laterally. This muscle aids in expelling air through pursed lips.

Platysma – This muscle is a broad sheet covering a large area of the front of the neck to just below the chin. This muscle depresses the lower jaw and also draws the lower lip down.

Depressor labii inferioris – Located between the chin and the lower lip. This muscle pulls the lower lip straight down.

Mentalis – A pair of muscles located on the tip of the chin. These muscles raise and push up the lower lip into a pout and causes the chin to wrinkle.

Figure 5.1: Grey's Anatomy Facial Muscle Diagram

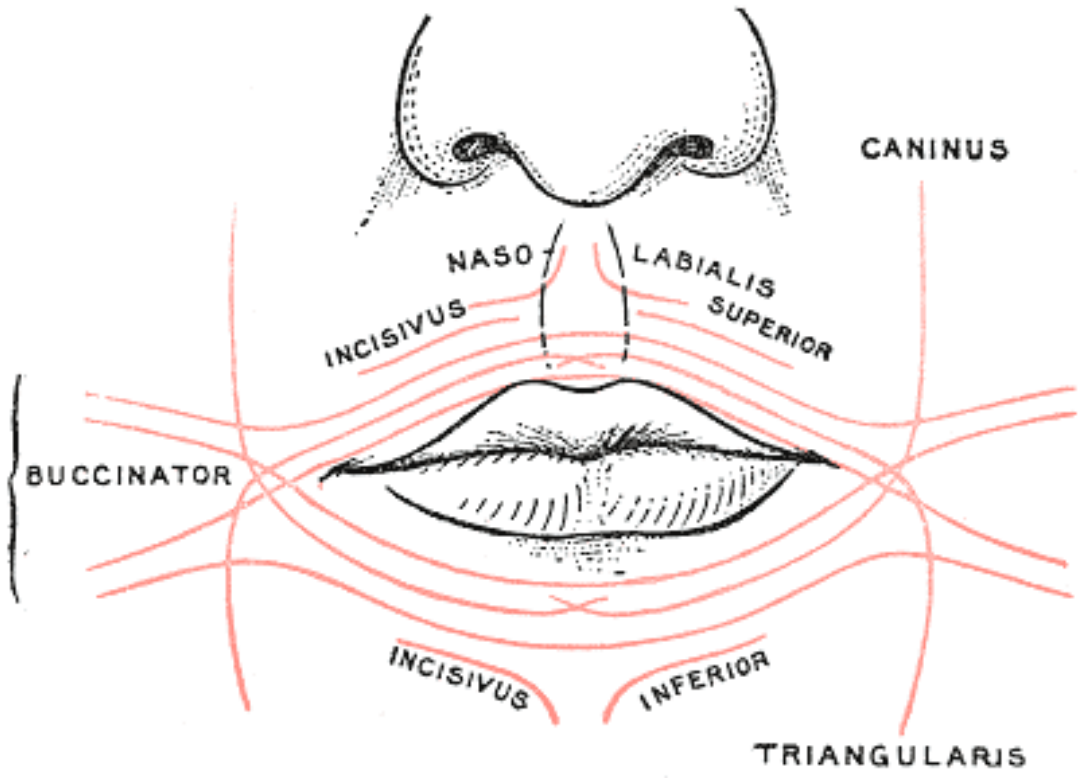


Figure 7.2: Diagram showing the arrangement of fibres of the orbicularis oris

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CD Track Listing

1. Fletcher Henderson Orchestra - Tell Me Dreamy Eyes 10.10.24
2. Fletcher Henderson Orchestra - Copenhagen 30.10.24 (Take One)
3. Fletcher Henderson Orchestra - Copenhagen 30.10.24 (Take Two)
4. Fletcher Henderson Orchestra - Naughty Man 14.11.24
5. Perry Bradford's Jazz Phools - I Ain't Gonna Play no Second Fiddle 02.11.25
6. Erskine Tate's Vendome Orchestra - Static Strut 28.05.26
7. Louis Armstrong and his Hot Five - King of the Zulus 23.06.26
8. Johnny Dodd's Black Bottom Stompers - New Orleans Stomp 22.04.27
9. Louis Armstrong and his Hot Seven - Wild Man Blues 07.05.27
10. Louis Armstrong and his Hot Seven - Twelfth Street Rag 11.05.27
11. Louis Armstrong and his Hot Five - Struttin' with some Barbecue 09.12.27
12. Louis Armstrong and his Hot Five - West End Blues 28.06.28
13. Louis Armstrong and his Hot Five - A Monday Date 27.06.28
14. Louis Armstrong and his Orchestra - Our Monday Date 25.04.39
15. Louis Armstrong and his Orchestra - New Tiger Rag 11.03.32
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19. Teddy Hill Orchestra - Lookie, Lookie, Lookie, Here comes Cookie
20. Fletcher Henderson Orchestra - Christopher Columbus 27.03.36
21. Fletcher Henderson Orchestra - Jangled Nerves 09.04.36
22. Gene Krupa Orchestra - Let me off Uptown
23. Gene Krupa Orchestra - After You've Gone
24. Gene Krupa Orchestra - Kick It!
25. Teddy Hill Orchestra - King Porter's Stomp 07.05.37
26. Boyd Raeburn's Orchestra - A Night in Tunisia 01.45
27. Doc Wheeler's Sunset Orchestra - How 'Bout that Mess 1941
28. Lionel Hampton and his Orchestra - Flying Home 1942
29. Duke Ellington and his Orchestra - Trumpet No End 1946
30. Duke Ellington and his Orchestra - El Gato 06.07.59
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32. Duke Ellington and his Orchestra - Blue Pepper (Far East of the Blues) 19-21.12.66
33. Charlie Barnett Band - All the Things you Are 1949
34. Innovations in Modern Music Orchestra - Maynard Ferguson 06.05.50
35. Innovations in Modern Music Orchestra - Maynard Ferguson 14.10.51
36. Jimmie Lunceford and his Orchestra - For Dancers Only 1937
37. Jimmie Lunceford and his Orchestra - Lunceford Special 14.12.39
38. Maynard Ferguson - Gonna Fly Now 1977
39. Maynard Ferguson - Theme from Star Trek 1977
40. Maynard Ferguson - MacArthur Park 1971
41. Maynard Ferguson - Hey Jude 1972